AUTHORIZING LEGISLATION

TUESDAY, JULY 9, 1957

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CONGRESS OF THE UNITED STATES,
SUBCOMMITTEE ON LEGISLATION OF THE
JOINT COMMITTEE ON ATOMIC ENERGY,
Washington, D. C.

The subcommittee met at 3:30 p. m., pursuant to notice, in room F–88 of the Capitol, in executive session, Hon. Chet Holifield (chairman of the subcommittee) presiding.

Present: Representatives Holifield (presiding), Durham, Price, Dempsey, Cole, Van Zandt, and Patterson; and Senators Anderson, Pastore, Gore, Hickenlooper, and Dworshak.

Staff members present: James T. Ramey, executive director; George E. Brown, John T. Conway, and David R. Toll, professional staff members and George Norris, Jr., committee counsel.

Representative HOLIFIELD. The subcommittee will come to order.

The subcommittee, as you know, has been holding hearings, and here are the fruits of it in this authorization legislation bill. We have done a rather exhaustive job, we think, on securing testimony on the general reactor program which will be in print tomorrow.

Neither the subcommittee nor the full committee is fully agreed on the items in this bill. I might say we have taken no vote on it, and ordinarily I think we would vote before we called you in. But we are trying to get along with the legislative program just as fast as we can in the House. I will not comment on what is happening over in the other body.

But anyway, we are trying to do our part in getting the legislative program through the House.

We have the original items which were submitted by the Commission, and also some additional items and adjustments which have occurred during the time of the hearing.

In addition to that, the majority of the members of the subcommittee have felt that there are some changes that should be made. We have gone into the four cooperative programs in the second round rather exhaustively. We have found that after 17 to 24 months of negotiation we do not yet have a contract on them.

We find that in analyzing the different programs they are quite different in some ways. In certain cases waiver of fuel has been requested and reprocessing has been requested and in others they have not been. In some cases the cancellation date of the reactor is 3 months, 1 year, and in some cases 5 years.

The price of steam, while none of these are fixed but are all in negotiation, ranges from a 2.88-mill request by the Piqua people to something like 13.5 mills by the Chugach people.

We have written some policy into the bill in a way that we think will contribute to the complete program and will make a rounded program.

In the case of the co-ops we have felt that direct Government construction and operational control of the second round and the Consumers project in the first round would get the job done quicker and with more benefit to the Government from the standpoint of complete control and access to the operational data and access to plutonium wherever plutonium is made in these reactors, without the circuitous type of arrangement which to some of us seems to have been made or is being negotiated.

You have had a chance now to study that part of it, and we have also added certain types of reactors which we think would fill the gap in research and development in the overall program, and we have gone so far as to locate them at what seems to us the reasonable place of location in each instance.

We have tried to cover some of the points such as the natural uranium, gas-cooled prototype and pilot plant work on the natural uranium heavy water reactor, and then of course the dual purpose reactor at Hanford which some of us at least have thought would be an advance in the art and in the technique toward the goal of economic power if we are going to have private reactors producing plutonium.

I might say that includes both for weapons and fuel use.

Then we have put in the recycling of the plutonium, a small recycle job to further the art so that the plutonium can be utilized as fuel.

Now that in general is my general statement on what we have done so far.

We would be pleased now to hear your reaction or the reaction of the Commission as the bill is now proposed.

Senator ANDERSON. Do you not think we ought to settle whether this session is completely executive or whether any part of what is said here today will subsequently be published? It is not material to me but I think we ought to know which it is.

Representative HOLIFIELD. I am perfectly willing for it to be either way, but what is the will of the committee on it?

Senator ANDERSON. It ought to be what is the will of the Commission; if they would rather come back in open session and testify on it, that would be one thing, but when the bill gets to the floor of the House or the Senate, the obvious question is going to be, "What is the attitude of the Commission?"

If we say this is executive, then you must some day have another session in which you can have other statements.

Chairman DURHAM. We have to go on the floor and justify it one way or the other.

Representative HOLIFIELD. Then I think if it is the will of the committee, we will ask that it be a public hearing, and if there is necessity of going off the record for any security reasons, then, when you request that, it will be granted.

Senator ANDERSON. It would seem to me desirable. There may be something more than security reasons. There might be a point in negotiation. I think whenever the chairman or any member of the Commission says, "We would like to have this not made public," that proper notation should be made and it can be left off.

I can understand how it would be very difficult for the Commission in the midst of negotiation to say we would be willing to give them $4 million more, but they are asking for $4 million. Automatically, they have got to raise it to $6 million if they do that because they have already committed themselves to $4 million.

STATEMENTS OF LEWIS L. STRAUSS, CHAIRMAN; HAROLD S. VANCE, MEMBER; K. E. FIELDS, GENERAL MANAGER; W. KENNETH DAVIS, DIRECTOR OF REACTOR DEVELOPMENT DIVISION; EDWARD DIAMOND, ACTING GENERAL COUNSEL; DON S. BURROWS, CONTROLLER; FRANCIS J. McCARTHY, JR., ASSISTANT CONTROLLER FOR BUDGETS; A. TAMMARO, ASSISTANT GENERAL MANAGER FOR RESEARCH AND DEVELOPMENT; JOHN M. BODLEY, ASSISTANT TO COMMISSIONER VANCE; AND BRYAN LaPLANTE, ASSISTANT TO THE GENERAL MANAGER, ALL OF THE ATOMIC ENERGY COMMISSION

Mr. STRAUSS. It is interesting that we had a similar situation at a subcommittee meeting this morning, at which Senator Pastore presided, and at which it was decided that the record would be reviewed not for restricted data, since none was discussed, but in order that if anything had been said that might have international political repercussions that could be embarrassing either to the individuals who had spoken, or to the country, that it could be eliminated.

May I say, this proposed bill which is before us we have only had since last evening, and this morning we were testifying and we have the General Advisory Committee here who have come on for their 3-day session with us, and there has not been an opportunity to give this the kind of detailed attention which its substance merits and which anything that is developed in your committee should have from the Commission.

Furthermore, the previous hearings on the subject of the authorization bill have been attended by General Fields as the principal witness for the Commission, and many of these questions which may arise today I will, with your permission, refer to him or other members of the staff.

It seems to us on the basis of a quick review that the bill provides for four additional reactor projects.

Let me also interpolate this thought: Tomorrow we go before the Appropriations Committee of the House and we will not be able to testify about the reactor part of our budget or the construction aspects of it and, of course, we are anxious to get ahead with this in order that we may complete our budget hearings. I say that so that you will know that under no possible construction are we dragging our feet.

This bill appears to provide for four large reactors in addition to the public-power projects which you have mentioned and to which I will refer later.

The first is described on page 2, item 7, as project 58–b–7, a prototype reactor for the production of special nuclear material and electric power in Hanford, Wash., $95 million. That I take it is what you have described, Mr. Chairman, as the dual-purpose reactor.

Representative HOLIFIELD. That is right.

Mr. STRAUSS. I will mention the others, and then refer to those.

The second one at the top of page 4, "Project 58–e–14, natural uranium, gas-cooled, power-reactor prototype not to exceed 50,000 electrical kilowatts, National Reactor Testing Station, Idaho," $40 million.

The third is the following item, "Project 58–e–15, heavy-water pilot plant to develop natural uranium–heavy-water technology not to exceed 15,000 electrical kilowatt equivalent, Savannah River, S. C.," $15 million.

And the fourth, the next item, is project 58–e–16, the reactor not to exceed 15,000 electrical kilowatt equivalent, Hanford, Wash., $15 million.

With respect to the dual-purpose reactor at Hanford, the feeling of the Commission——

Representative HOLIFIELD. You said four large reactors. You really do not classify those last two as large reactors, do you?

Mr. STRAUSS. No; I should say four large projects. The second ones are not reactors at all in that sense. I am separating them really from the Elk River, and Wolverine, Piqua, and Chugach, and the Consumers proposals.

The dual-purpose reactor is one which the Commission has had under consideration since late 1952. In 1953, the Commission reached the conclusion that to build a reactor to produce power and to produce plutonium represented a compromise with the best design to produce either. That is to say, it could not produce power as efficiently or as cheaply or plutonium as efficiently or as cheaply as reactors designed for power and production primarily, and for plutonium production primarily.

The Calder Hall reactors in England which are dual-purpose reactors are designed, we were informed, primarily for plutonium production, and we have been informed quite recently by an article that appeared in Nature, a British publication, within the last few weeks, that Sir Christopher Hinton, the technical director of the Calder Hall project, has stated that the new power reactors will no longer be maximized or optimized for plutonium production. I believe the reason is that it has substantially increased the cost of power over and above the cost at which they think they ought to be able to produce power.

We also, on our own calculations, have found that an enrichment of the uranium in those reactors very substantially increases the power output.

Senator ANDERSON. Who is this Sir Christopher Hinton?

Mr. STRAUSS. I will try, Senator, to give you an analogy. He is a Zinn, Weinberg, and the rest of the heads of our reactor laboratories in one. He is their technician in reactors.

Senator ANDERSON. Connected with the British, is he?

Mr. STRAUSS. His title is managing director of the Industrial Group. Their organization does not exactly parallel ours, but his functions would be combining those of the men I have just indicated. He operates under Sir Edwin Plowden, who is the chairman of the British Atomic Energy Authority.

Representative COLE. Is he not as near the counterpart of General Fields as the British system has?

Mr. STRAUSS. I would think General Fields' authority extends to the whole enterprise here, and I do not believe that Hinton has any authority in the research end where Sir John Cockroft, as the deputy to Plowden, would have more to say about their research activities, and I do not think Sir Christopher Hinton has anything to do with their weapons activities.

Chairman DURHAM. Do we not secure any information on their reactors except through magazines?

Mr. STRAUSS. Yes; we do have an agreement with them, Mr. Durham.

Chairman DURHAM. That is what I thought.

Mr. STRAUSS. On the exchange of information about reactors business that does not extend to gaseous diffusion plants. We have not agreed to give them any information about the gaseous diffusion plant, nor they us.

Senator ANDERSON. Could that be a partial reason why some of these countries are not as interested in enriched uranium?

Mr. STRAUSS. I think Senator, it is. I think some countries may feel that their opportunity of getting natural uranium does not depend on one source of supply, and the opportunity of getting enriched uranium at least for the present is dependent upon the continued good will of the United States.

On the other hand, when we have made agreements with countries to provide them with enriched uranium for their reactor program, they know that it is an undertaking that is as good as our word, and I do not know of anything in our history that should lead them to doubt it.

Senator ANDERSON. Would the investment required for a gaseous diffusion plant not be extremely high in comparison with the output that they might expect in the beginning of it? We have a going establishment producing a tremendous lot of it, of enriched uranium, and they might want to go into a rather small quantity of it.

Mr. STRAUSS. That is true, but a group of countries together such as Euratom, with a very ambitious reactor program for the six countries, have talked about building a gaseous diffusion plant to serve all of them.

Representative HOLIFIELD. It seems to me that the argument that you have made and the statements that you have made in regard to retaining our knowledge and techniques in the gaseous diffusion field is a very cogent argument for us filling the gap in our technology which apparently the British are planning to fill in theirs by showing an interest in enriched fuel that we should also show an interest in the natural uranium process.

If we plan to do any kind of an export business with people who want to be free of a one-source supplier of fuel, that seems, to me, important. I also point out that apparently in your third round, you did call for a natural uranium type of reactor and Dr. Zinn is planning on building one.

Mr. STRAUSS. That is right, the Florida Power group. And I will now come to the second item and what I was going to say to you about that.

Representative HOLIFIELD. So you have approved at least the principle that there should be some advance in that technology?

Mr. STRAUSS. That is correct.

We believe in enriched uranium and we believe that a natural uranium reactor will be more efficient with some degree on enrichment. Here are some charts that are too small to show you so that everyone can see them, but on the basis of British data, on the basis of natural uranium enriched to—will you explain this, Dr. Davis?

Dr. DAVIS. These are some data from a British report which showed the effect of enrichment on the power output of a given sized reactor, keeping the size of the reactors fixed but showing the effect of the enrichment on the heat output, and starting with a 100 percent output with natural uranium. What this showed was that by increasing this enrichment by 10 percent which would be raised only to about 0.79 percent enrichment, 10 percent above normal, the heat output of the reactor would go up by 50 percent, with an indication that if it were raised by another 10 percent, that the output would be nearly doubled.

This, as I say, is from a British publication.

Senator HICKENLOOPER. The 10 percent refers to the U–235 content and not to the total volume of uranium?

Dr. DAVIS. It is to the degree of enrichment of the uranium. This is 0.71 percent, which is natural, to 0.79 percent, and then perhaps up to about 0.83 percent would result in doubling the output. This is why we are convinced that enrichment is important not only to us but to the British, and that they are banking on either getting this enriched uranium or being able to accomplish the same enrichment by plutonium recycle.

Senator ANDERSON. Mr. Chairman, would it be your statement to us that in view of what we have learned about the British program and what the Commission has developed in the way of its own studies, that a dual-purpose reactor is not justified at this time?

Mr. STRAUSS. I am afraid, Senator, that we are confusing a discussion of the dual-purpose reactor and the natural uranium gas-cooled reactor. The dual-purpose reactor is not necessarily gas cooled and it is not necessarily natural uranium fueled. Let me concentrate first on the dual-purpose reactor. We do not think it is economic, and we believe that the amount of plutonium that it produces; for example, a $95 million reactor, it will be 15 years before it would produce sufficient plutonium to offset the cost.

To put it another way, you could build a reactor to produce plutonium for less money which would produce in far less time the amount of plutonium that this reactor would only produce in 15 years.

What I have tried to say about the natural uranium gas-cooled reactor, which is a power reactor solely with plutonium as a minor by-product, is this: The Florida Power Group is studying that reactor to make us a proposal under the third round, and we should not spend Federal funds unless we find that we cannot get that reactor built by private funds.

Senator ANDERSON. In every reactor that comes along, we are going to spend Federal funds.

Take these four cooperatives, and it is going to be all Federal funds.

Mr. STRAUSS. That is quite a different situation. The four cooperatives, as I will develop later, cannot borrow money and they have no capital.

Senator ANDERSON. Do we not jump from one to the other here? I am trying to say, can we finish with the dual-purpose reactor?

Mr. STRAUSS. Yes, I only referred to the co-ops because you did, Senator.

Mr. FIELDS. On the statement about the dual-purpose reactor, I believe Chairman Strauss was starting to say that if you were to take the $30 price that we have established and apply this $95 million cost to the purchase of plutonium at $30 per gram, it would take this reactor 15 years to supply that amount of plutonium. I think that is what you were trying to say, Mr. Chairman.

Representative PRICE. Why do we not have some comparison of the figures that we have on this, and see if the Commission agrees with these?

Representative HOLIFIELD. We have a chart presented to us by Mr. Johnson, of General Electric, and we are aware of these different comparisons.

Mr. FIELDS. We saw it the day it was presented here.

Representative HOLIFIELD. I would like to show you the chart and perhaps we could put it on the board.

(Discussion classified.)

Mr. STRAUSS. In sum, we see neither an economic nor a research reason for building the dual-purpose reactor and the position of the Commission remains as it was.

Representative HOLIFIELD. Now, in the case of the PRDC, we have had various statements by them before us and one of the statements that they made recently was that in a period of 10 years' time—and please don't hold me to these exact figures—they plan on producing steam at the value of $43 million and they plan on producing plutonium at the new price of $30 if it is carried forward to 1970, at a total income of about $31 million.

Now there are quite a number of reactors being planned in the United States that are being planned on a dual-purpose basis. They are being planned that way on the hypothesis that it will help to cut down the cost of power, providing they have this byproduct of plutonium.

Now, I think the committee in prior years would have been willing to admit from the evidence that has been put before them from different sources, that if you go all out for power you may get a cheaper power possibly or if you go out for plutonium you may get a cheaper thing if you go into the big-scale production of plutonium. At least that used to be the theory. Now we have evidence that we can produce cheaper plutonium with power as a byproduct.

But in any event there is a median by which it seems to us where there can be an offsetting of plutonium revenue to power revenue in which you apportion to the power revenue the conventional cost of conventional power. You allocate your kilowatts on the basis of conventional cost, and then what is left, the amount that is left in costs of reactor operation is to a certain extent made up by the plutonium sales.

So it seems to us from the charts presented there, and I refer now particularly to the one where $108 million I believe was the capital plant investment, it shows there a cost less than $30.

Mr. RAMEY. Even more striking is the same type of reactor blown up as a larger reactor, which is I think No. 2 on your chart there, which shows that you would get the cost of plutonium down to a very low figure per gram as against these others.

Mr. STRAUSS. It is difficult to comment on this, but I would call attention to the fact and I would like some opportunity to study it, that both of these figures are based upon a 25-year depreciation period for the plant, and on its ability to sell the power in that area at 3½ mills. I think that is above the figure that obtains.

Representative HOLIFIELD. That was very carefully computed by these people as a projection of the cost of conventional fuel in that area for the next 25 years and an average was struck, I believe that is the way they explained it to us.

Mr. STRAUSS. I hope that you will want us to give this study, and we will, but it is impossible to just look at the table and comment at first sight.

Representative HOLIFIELD. The Commission people were here, Mr. Chairman, when all of this was given on the board. We had them present and the chart was drawn on the board.

Mr. STRAUSS. May I ask with your permission if Dr. Davis or General Fields have any comments to make on this?

Mr. FIELDS. We were here when the figures were given. I do not believe we have any disagreement with the calculations other than we have not checked the initial costs. There is a new estimate of cost of 1 or 2 of these reactors. It gets back to a question of how long an amortization period is used, as to whether the relative costs of plutonium are higher by a dual purpose route or by a straight production reactor.

You will get a change over here depending upon how long a period of time you say that you wish to have plutonium additionally over what we are now producing.

(Discussion off the record.)

Representative HOLIFIELD. I do not know whether there is any argument as to whether we need more plutonium or not. But all of the testimony that we have had from Dr. Teller and Dr. Mills and the other doctors before us, Dr. Lawrence, and from others that we have had before us, has been that if we are going to go into the small weapon field they are going to need more plutonium. Certainly if we develop the plutonium recycling which I think we will all admit is desirable, if we are ever going to take this plutonium which we plan to use in bombs, if the time ever comes when we can convert it to peacetime application, it will be necessary then to burn it as a fuel.

Mr. STRAUSS. The plutonium recycling is absolutely essential because plutonium is going to be produced in every reactor.

But the dual-purpose reactor does not advance plutonium recycling; I am sure you understand that.

Representative HOLIFIELD. I realize that, but the point I was making is that the recycling would give us the peacetime use of plutonium which we do not have now.

Mr. STRAUSS. It is a very important part of our research operations at the moment.

Senator PASTORE. You said that it would not be economical to have a dual-purpose reactor at Hanford. I think you indicated that it would not be advisable to have two such projects inasmuch as you had the Florida Group undertaking a dual-purpose reactor.

Mr. STRAUSS. I am sorry, Senator. This may be my fault for confusing this. The Florida Group is proposing a natural uranium gas-

cooled reactor and this is what is generally referred to as the Calder Hall type, but heavy water moderated, where Calder Hall uses graphite, but it is gas cooled and natural uranium. The fuel is natural uranium and the dual-purpose reactor is not to be confused with that. The dual-purpose reactor which the Commission has been considering, as I said a few moments ago, since 1952 is for the production of power and plutonium. The Commission decided against it in 1953. When I returned to the Commission, I took the position that I thought it had acted hastily in throwing this out. I asked Dr. Zinn, Dr. Weil, who was at that time with the Commission, or had just left, and Dr. Weinberg and others, to meet with me, and they convinced me that the decision of the Commission was correct.

We had two objectives at that time, which remain our objectives. One was to produce power as cheaply as possible, and the other was to produce plutonium as cheaply as possible.

And the design for the reactors to do either of those things compromised the result if the other was included. That is to say, a reactor to produce cheap power would produce plutonium inevitably but if plutonium was sought as a product of equal importance, the price of power was affected adversely.

The same was true with the production of plutonium and this was so marked in the minds of the Commission, and I think, of this committee as well, that when the plutonium reactors were planned at Savannah River which produce large amounts of heat, it was decided not to couple them up with power production because the cost of the power would have been so high that it would not have paid to do so.

Chairman DURHAM. Might I ask a question? This year when you asked the Budget Bureau for $150 million, what type of reactors did you have in mind?

Mr. STRAUSS. You mean last December?

Chairman DURHAM. Yes.

Mr. STRAUSS. We had two types in mind. One was an aqueous homogenous reactor, and the other was a natural uranium heavy water reactor. There, you recall, Mr. Durham, we had an understanding with the Bureau of the Budget and with the President that if we did not succeed in getting private industry to build them, that they would support the Commission in a request to the Congress for appropriations to do it ourselves.

Chairman DURHAM. Would that not have been duplication of what you already have in the program?

Mr. STRAUSS. No, sir. They are not in the program.

Senator ANDERSON. When you stated a minute ago that there was neither an economic nor research reason for building a dual-purpose reactor, that is based on the fact that you thought this 3½-mill rate was probably even a little high. We asked the question subsequently of the people who came in here what would happen if there was a power rate of 6 or 7 mills, and of course that completely changes the plutonium figure and brings it down to where plutonium is practically free.

Under those circumstances would you still say there was no economic or research reason for building a dual-purpose reactor? I am thinking of Senator Pastore's part of the world, where costs are pretty high, and where demands are very extensive.

Now, I realize that Niagara Hudson Power may complicate the situation, as it has out in the West, but the testimony, and I cannot dig it out immediately, but if we find it in there it would provide that if you had rates running up to 6 mills, which is the rate that has been contemplated in the upper Colorado storage project, and the rate which the Idaho Power Co. has used, and it is now paying for power, and various other things out in the West, not just on the Columbia River, but the plutonium would be practically free.

Mr. STRAUSS. We do not believe that we can construct a reactor under any of these present principles to produce power at a cost of 6 mills per kilowatt-hour.

Senator ANDERSON. That is not what I said at all. What I said or I thought I tried to say, and I will try it again, is that we raised the question as to what rate for power had been included in the study presented by Mr. Johnson and which you have in front of you. He said they had used a figure of 3½ mills, because their economic survey showed that by the time this would be in operation, the postage stamp rate would probably have increased to that level.

(Discussion off the record.)

Now, at that level, you have the low mentioned figures of $14.40 and $26.20 for plutonium. But if you changed the power rate to 6 mills, and credited the plant with 6 mills for its power, instead of 3½, it practically gave you the plutonium free. Would that not be desirable?

Mr. STRAUSS. Would you comment on that, Dr. Davis?

Dr. DAVIS. If this is all you did, that might be true, but I think one of the thoings we are forgetting is that this is a plant built at Hanford and it includes no interest on the money which is put into it by the Government and it includes no industrial financing, and it makes use of land and facilities and auxiliaries that are already there.

Senator ANDERSON. Tell me about Shippingport. How much interest is being charged on Shippingport, and how much for management. You do it all right if the power company is involved as a private power company, and what is wrong with trying this from a research and economic standpoint?

Dr. DAVIS. As I understood the point of your question, Senator Anderson, it was what would be the value of such a reactor built by Niagara Mohawk in New England or someplace of this sort. If you take into account these things that have been left out of this cost estimate, what you find is that the cost of the plutonium is either very high, or that the cost of the power is very high.

Senator ANDERSON. If you will just continue to apply that all of the way through, then you will not do anything for these four cooperatives, would you?

Representative HOLIFIELD. You would not build any demonstration plant then.

Senator ANDERSON. If you are going to put the yardstick against one, you might as well put it against all of them. What you have said is equally applicable to these four cooperatives.

Dr. DAVIS. I do not agree.

Senator ANDERSON. What is the difference?

Dr. DAVIS. The difference is entirely in the type of reactor.

Senator ANDERSON. What is the difference? And we are talking about something that might develop something of research standpoint.

Dr. DAVIS. The difference is that the water graphite type of reactor that you are talking about here is an extremely large reactor to be at all economical, even relatively, and it is one that has had most of the promise of further exploitation in terms of making it bigger and cheaper already taken out of it by the work that has already been done, and that in contrast the types of reactor that we are talking about under the first and second rounds and the third round and in our reactor development program, are reactors that we think when developed will be a great deal cheaper than the water graphite reactor shows any promise of being.

Senator ANDERSON. For instance, at Chugach which is going to deliver current at about 90 mills.

Dr. DAVIS. I do not believe it is that high, and this is a very much smaller reactor.

Representative HOLIFIELD. The smaller they get, the more uneconomic?

Dr. DAVIS. Generally the smaller, the more uneconomic, but the water graphite, even in a very large size, is uneconomic.

Senator ANDERSON. You couldn't say.

Mr. RAMEY. The committee has received much testimony that you can't say that these proposed reactors are economic or uneconomic, that we are in the horse-and-buggy days still.

Dr. DAVIS. Mr. Ramey, one cannot necessarily say which is going to be the cheapest, but I think that we are developing some opinion of those which look as though they will never make the grade.

Representative HOLIFIELD. We feel like we have had evidence before us of people that are reputable people in the industry, and we feel that we have certainly enough evidence before us to allow us to exercise some judgment, too, in this matter.

Now, is it because the committee is interested in filling some of these gaps that the Commission does not want to go along with us on anything like this? Is it because we have suggested it?

Mr. STRAUSS. Mr. Holifield, we have not the slightest doubt whatever that a dual-purpose reactor can be built. There is absolutely no question about it.

Representative HOLIFIELD. Do you think it would increase the technology and the art to be able to build better dual-purpose reactors than the PRDC, for instance?

Mr. STRAUSS. I do not think that the dual-purpose reactor has anything like the promise that the PRDC has.

Representative HOLIFIELD. Do you consider it a dual-purpose reactor?

Mr. STRAUSS. More properly, it is a breeder reactor.

Representative HOLIFIELD. It produces according to their own figures given us last week, or the week before, about $43 million worth of steam, in a period of time, and about $31 million worth of plutonium. To them it is an important factor that they have got a dual source of income there.

Why can't we go into a dual-purpose technology and try to develop it for the benefit of everybody in the Nation?

Mr. STRAUSS. It is a dual purpose reactor, so that one might say we have developed a dual purpose reactor without a large commitment of public funds, but the PRDC is optimized for power. The production of a fissionable material in the configuration of the reactor

is a dividend which is not involved in the type of design for the dual purpose reactor that has been suggested for Hanford.

Representative HOLIFIELD. Do you not think if Dr. Johnson is correct in his figures, that there are two things that are needed at Hanford? There is power to operate the facilities, and there is plutomium which is their major purpose out there, to develop plutonium?

Mr. STRAUSS. If it is the major purpose, you can produce it far more cheaply by duplicating the kind of facilities that are there.

Mr. RAMEY. Their figures don't show that.

Mr. DAVIS. I sat here and I listened while Dr. Johnson presented these figures, and I think with one or two exceptions where I question the numbers, I think on the assumptions which he carefully spelled out and which he made, the numbers he has given are essentially correct. However, I do not think that I heard him say at any time that he was recommending this as a power only reactor or recommending its development as such.

Representative HOLIFIELD. We are not recommending it as a power only either. We are recommending it as a dual-purpose reactor so that it can be applied by Mr. Cisler or anyone else, anywhere in the Nation, that they want to. We are doing research and development to the tune of several millions of dollars.

Now, for the dual purpose private reactor, is there any reason why you should not help out on the dual purpose technology in your own laboratories with an aggressive program, on a different type?

Dr. DAVIS. The PRDC reactor and the fast reactors are directed not toward dual-purpose operation, but simply being able to burn up all of the uranium instead of only a very small fraction of it.

Representative HOLIFIELD. I am looking at it from the economic standpoint at this moment. I am looking at it from the standpoint of the reactor which by a combination of plutonium production and power production each can cheapen the other, whichever way you want to do it. If you want to charge the conventional price for the electricity, then it is obvious that you are charging a fair price and then if you take the residue of the costs and apply it to the plutonium, it is pretty obvious that you have a price for the plutonium.

Mr. DAVIS. But the PRDC type of reactor is directed toward a reactor which could operate when developed profitably without anything except fuel value being paid for the plutonium produced.

Representative HOLIFIELD. When you set the $30 price, did you not consider the private production of plutonium in setting that price?

Mr. FIELD. In that way do you mean?

Representative HOLIFIELD. Did you not consider that this was going to be of some element of assistance to Commonwealth, for instance?

Mr. FIELDS. We recognized that would be true. On the other hand, this was set on the basis of its intended use and in accordance with the act.

Representative HOLIFIELD. I realize that, the intended use.

Mr. FIELDS. This was controlling more than the fact it would be of benefit to the company.

Representative HOLIFIELD. Was it not a fact that you set the price for repurchase on the basis that you needed plutonium?

Mr. FIELD. On its intended use; yes, sir.

Dr. DAVIS. In a few years, you are going to have a fuel value for plutonium and we have got to develop reactors that will not only use this plutonium at its fuel value but which will operate economically at this value. Our research program is directed toward developing this type of reactor. If we develop dual purpose reactors that are only economic when the plutonium is worth $30 a gram, we have not developed an economic reactor.

Mr. RAMEY. Mr. Davis, we got a notice the other day that they were changing the design of the Detroit Edison reactor. What is the effect of that under your $30 price for plutonium? Would that optimize their income?

Dr. DAVIS. A longer burnup, was it not, Mr. Ramey?

Representative HOLIFIELD. I think it was a faster burnup.

Dr. DAVIS. I thought they had decided they would run to 3 percent burnup at the end of 10 years.

Mr. RAMEY. I do not know what the change of design was, and I was wondering about it.

Mr. STRAUSS. Let me suggest a test that will appeal to those of you who are businessmen here. The Detroit Edison Co. and its associated companies have come to the Commission to build a reactor near Detroit in which they are investing a large sum of money, the bulk of the funds going into it are privately raised. I have not heard that the GE and its group have made any proposition to us to build the dual-purpose reactor of the type suggested by Dr. Johnson with other than Federal funds.

It does not hold any promise at the present time to interest private capital. That is the real test.

Representative HOLIFIELD. Can we put that test into the consumers of Nebraska, and the four co-ops, and can we put the same test to them?

Mr. STRAUSS. Shall we discuss those now, Mr. Chairman?

Representative HOLIFIELD. Well, let us just answer that question. Are we going to put them in there?

Mr. STRAUSS. I don't think that those are economic. On the other hand——

Representative HOLIFIELD. I don't think any of them are economic.

Mr. STRAUSS. Each of them is developing a new type of reactor on a small scale, and not a huge thing such as is proposed here for Hanford. The Wolverine is an aqueous homogeneous reactor and we do not have any. Chugach is a sodium-cooled deuterium moderated reactor and we do not have any at the moment. The Piqua, Ohio, reactor is an organic one. The Consumers will be a sodium graphite reactor such as has been built at Santa Susana, Calif.

Representative HOLIFIELD. And the main purpose is the development of the art.

Mr. STRAUSS. That is right.

Representative HOLIFIELD. We do not apply the economic principles to it, but the minute you start talking about developing the art of a dual-purpose type of reactor, you start applying the economic standard to it. I am interested in the economic standard, only as an adjunct to the main purpose of increasing the technology and the art.

Dr. DAVIS. Mr. Holifield, we have a job to try and decide which of the various kinds of reactors are to be developed, going through all the stages of development, of reactor experiments and prototype re-

actors and so on. We are making a gamble that the ones that we select when they have been carried through this process by whatever mechanisms we can devise, will, when they are successful, be able to operate economically as power only producers.

Now, we have looked at quite a number of other reactors and we have looked at the water graphite reactor and we cannot convince ourselves that this is a type which when put through this process will result in a reactor which will be economical.

Chairman DURHAM. Are you expecting those to supply the amount of plutonium we are going to need?

Dr. DAVIS. The various power reactors including some that would come into operation about the same time as if you built this proposed dual-purpose reactor, will inevitably, since they are slightly enriched reactors, produce plutonium. For a period of some time, the Commission has proposed to purchase this plutonium.

But after this initial period is over, and after these developments are over, this type of reactor, if it is successful, has to stand on its own feet as a power producer and not as a dual-purpose reactor.

Certainly the Yankee and these other reactors will produce plutonium.

(Off the record discussion.)

Mr. STRAUSS. The Atomic Energy Act requires the various agencies and departments of the Government to be responsive to your inquiries and I have no doubt that they will.

Representative HOLIFIELD. We have a long history of the Defense Department lagging in atomic weapons.

Mr. STRAUSS. I have just seen this statement for the first time, and I notice that the reactor, the dual-purpose reactor mentioned by Dr. Johnson, is a 300,000 kilowatt reactor. This is bigger than anything that we have. It is not a pilot plant by any manner of means. It will be a large affair. The largest reactor that is being built today or planned today by private industry is one by Consolidated Edison, 275,000 kilowatts.

Chairman DURHAM. When would you expect to buy your first plutonium from private industry at the present time that is building a reactor that will produce plutonium? When are you going to buy your first plutonium?

Mr. STRAUSS. I would think by 1960 or 1961, that plutonium will be produced in reactors. It will be produced as soon as they start operating, but cores will be processed and pultonium received.

Chairman DURHAM. You are going to have to buy that back necessarily, under the law.

Mr. STRAUSS. Yes; and we do not want it in anyone else's possession. That plutonium we will be able to use for weapons. We will also be able to acquire pultonium from reactors that are fueled overseas from our special nuclear material, but such plutonium we buy at a lower price, and do not use for weapons.

Chairman DURHAM. Has the Commission given any thought to replacing plutonium-producing reactors at Hanford?

Mr. STRAUSS. From the point of view of deterioration?

Chairman DURHAM. That is right.

Mr. STRAUSS. After that subject had been mentioned, not long ago, I inquired about it. You will recall, Mr. Durham, that some 8 or 9 years ago we were very seriously concerned with the life of those

reactors. The reactors are constantly maintained and we do not have any fear of a breakdown of those reactors.

Representative COLE. I would like to invite the comment of the Chairman with respect to this item of dual-purpose reactor which specifies the location to be at Hanford.

In your opinion, does it naturally follow that, since General Electric is the management out at Hanford, General Electric would be the company that gets the contract to make that machinery?

Mr. STRAUSS. Mr. Cole, do you mean assuming that the decision had been taken to go ahead and build a dual-purpose reactor at Hanford?

Representative COLE. Yes.

Mr. STRAUSS. I would say, by reason of the fact that General Electric is contractor in the locality, and that there are certain services and facilities which would be necessary that are already in existence, that a duplication might be required if others were to do it. But I would assume that, if the Commission were overruled on the general principle, we would undertake to see what kind of proposals we could get from others, and weigh the costs.

Representative COLE. Having all of those factors in mind—and it is on that that I based the question—does it not naturally follow that GE would be the ones that get the contract?

Mr. STRAUSS. It would seem to me that they would be in a position to make a more attractive offer to the Commission.

Representative COLE. It is entirely logical that they would be the ones, and if you get anyone else it is going to cost more.

Mr. STRAUSS. Yes, sir.

Representative COLE. And result in interference between management of an existing operation, and you bring in a different company?

Mr. STRAUSS. We had an experience with that at Arco, as you may recall, some years ago, and it was not a happy one.

Chairman DURHAM. Since you have asked that question, could you think of anyone better qualified to do the job than General Electric?

Mr. STRAUSS. They have served the Commission and the country extremely well.

Chairman DURHAM. Exactly.

Representative COLE. When we focus the location of this reactor at a specific spot, we are directing that this business, $95 million, go to a specific company?

Mr. STRAUSS. That could well be the effect of it.

Representative HOLIFIELD. But, at the same time, there is no mandate that you make an uneconomic arrangement.

Representative COLE. The most economic arrangement would be with the ones——

Mr. STRAUSS. If we opened this to the widest kind of competition, the fact that the General Electric Co. was there, or that any company was there, with its people there and its facilities there, it would be able to absorb a part of the costs so that it could underbid competition. I think that is automatic.

Mr. FIELDS. There is another point with respect to the dual-purpose estimate. That estimate is contingent upon it being built at a site where other auxiliary facilities are already in being, and it would have to be increased markedly if this were not to be built at either Hanford or Savannah River, I presume.

Mr. RAMEY. If the Government adopted as a policy requesting an enlarged amount of plutonium, an enlarged small-weapons program, and maintained this $30 price, would the Commission then resume contacts, or has the Commission under this $30 price made any contacts, with private industry to produce plutonium?

Mr. STRAUSS. No; I think, Mr. Ramey, that if the President placed upon us, as he is authorized to do at least once annually, a requirement to produce more plutonium than we are producing, and more weapons than we are producing, we would, naturally, be inclined to do it in the way that would represent the least possible cost to the taxpayers and the lowest unit cost per gram of plutonium; unless I am misinformed, that would mean a duplication, with such improvements as we could make, of the most recent Savannah River reactor or Hanford reactor.

Representative PRICE. You say if the President would put that requirement on you; naturally, he would not put the requirement on you unless you said that you had such a requirement.

Mr. STRAUSS. Of course not.

(Discussion off the record.)

Mr. FIELDS. If we had a requirement for more plutonium, if this requirement were to extend out in years beyond anything we have had to this date, then some of these assumptions, perhaps, could come into play, where it would be just as cheap to do it by dual-purpose reactors. There is a crossover at some point off in the future.

Representative HOLIFIELD. We will never know where that crossover is unless we develop a reactor.

Mr. FIELDS. We have a very good estimate of it, depending upon the basis of the assumptions you made.

Representative HOLIFIELD. Now, let us go to the next three reactors at the top of page 4.

Mr. STRAUSS. I have commented on the fact that the natural-uranium, gas-cooled reactor is a type of reactor that we understand the Florida power group will propose, or have proposed.

Mr. HOLIFIELD. Now, I think that is a heavy-water type, and this is a graphite type here. Now, very frankly, some members of the committee feel that we do not want to see the Rickover team dissipated. We feel that this would be a natural field for the Rickover team to work in, in conjunction with their naval reactors.

As they are finishing up with the Shippingport reactor, and there is a fine team present there, and they are close to the Bettis laboratory with its branch out at Arco, and we felt that, if we could put this team at work in this field, which is a gap in our own production, we might come out of it with something that would be a real advance in the art.

Mr. STRAUSS. I would certainly feel, Mr. Chairman, that to hold such a team together might be a very desirable thing for the Commission to do, but to inaugurate a $40 million project for the purpose of doing that, I think, would be the wrong way to do it.

Representative HOLIFIELD. We certainly do not think that is the only thing.

Mr. STRAUSS. They are actively engaged now in the Shippingport reactor, which, I regret to say, does not promise completion at as early a date as I had hoped. They will be held together on that enterprise for quite some time to come.

Representative VAN ZANDT. Could you give us a new date, if it is possible?

Mr. STRAUSS. The last date I heard was November of this year. But it continually is being stepped back. It is November or December.

Representative HOLIFIELD. What was the scheduled date?

Mr. STRAUSS. There was once a suggestion that it could be finished last fall.

Dr. DAVIS. The original schedule that was established early in the project was to load the core into the reactor this July; that is, this month, and we are several months off of that.

Representative HOLIFIELD. We are not impressed by delays and postponements of completion in this business. We have seen this happen before. We have had testimony, Mr. Durham took the committee up to the Bettis plant, and we had a day's testimony up there and the testimony we received from the Westinghouse group was that they would have people available very soon to go into a new project if the Commission saw fit to give them a project for them to go into.

We have been so impressed in this committee over the years with Rickover's performance, that very frankly we would like to see him and his group not disbanded, but kept together if it is possible on a meritorious project, and not on a make-work project, we don't mean that. Some of us feel that this field is a gap that needs to be filled.

As I understand, the Commission does not recommend this project.

Mr. STRAUSS. For the simple reason, as a matter of fact as I have it here, it did not indicate that this was to be graphite moderated, and that is your language that I had before me.

Representative HOLIFIELD. It was explained yesterday.

Mr. STRAUSS. I am saying that the language that I have makes no reference to it.

Representative HOLIFIELD. The heavy water development, the next project there, was in our opinion something that needed to be done in the heavy water technology, a pilot plant of that type we thought should be made.

Mr. STRAUSS. With respect to the next project——

Representative COLE. Before you leave item 14, I would like to ask you the same question as applying to the one at Hanford. If item 14 is enacted, and this activity is to be located at Arco, the natural consequence would indicate that what company gets the contract?

Mr. STRAUSS. I don't think the situation there is quite as clear cut as it would be at Hanford. There, there is one contractor, the General Electric Co. At Arco, there are a number of contractors. There is Phillips, and there is General Electric, and Westinghouse, and so on. So that there are other organizations in the area, Mr. Cole.

Representative COLE. The basis for this justifying item 14 is to utilize the Rickover outfit in Pittsburgh, and the Bettis plant. Utilizing the talents of that outfit would indicate what company would get the contract to manufacture the equipment.

Mr. STRAUSS. I would respectfully submit that this is really an administrative decision if anything possibly could be, namely, who the Commission employs of its staff on a project. It seems to me that you might want to carefully consider before taking a step that was such an extension of authority.

Chairman DURHAM. Rickover was the first one that recommended that we go to competitive bids on reactors, as I recall.

Representative HOLIFIELD. We had the problem of keeping Admiral Rickover on the job in the Congress, and we had that job a few years ago, when he was going to be relieved of his duty in the Navy, and we adopted a little policymaking. Sometimes we feel that maybe the Congress should set some of the policy in this Nation, and the administrative agencies should help to carry it out. We feel like we have a little bit of responsibility when we have to put up hundreds of millions of dollars and we feel that we might have a little bit to say as to the wisdom of how it is spent and the general direction of it. We do not see the clear-cut line. It is up to us to go back and get elected and it is up to us to come here and vote the appropriations for the work you are doing, and sometimes we think that our judgment of 10 or 12 years in this committee might be just about as good as some other people's.

Mr. STRAUSS. I don't doubt that it is better. My observation is based upon the separation of powers.

Representative HOLIFIELD. I am well acquainted with the division of powers.

Representative VAN ZANDT. In connection with project 14, does that $40-million figure look accurate?

Mr. STRAUSS. I would have no way of judging that. I would like to ask, a 50,000-kilowatt natural uranium gas cooled reactor, of $40 million, does that sound within the ball park, Dr. Davis?

Dr. DAVIS. Since it says not to exceed 50,000, presumably the size could be adjusted down somewhat. The gas-cooled reactor we know from what we know about the British experience is exceedingly expensive in terms of dollars per kilowatt. This would not come anywhere near covering the cost of the development work. That would be very expensive, and would require considerable additional facilities.

Representative VAN ZANDT. Now, the additional information that we will develop as a result of building this reactor, in connection with that, will we not get similar information from the British as a result of this new agreement?

Mr. STRAUSS. We have an agreement to exchange information on the Calder Hall reactor, that is correct.

Representative VAN ZANDT. Have they gone critical?

Mr. STRAUSS. The Calder Hall reactors are operating.

Representative VAN ZANDT. And there are a couple more.

Mr. STRAUSS. There are two at Calder Hall that are operating, and there are others in process of construction.

Dr. DAVIS. There are four reactors altogether. There are 2 operating, and Calder Hall B where there are 2 more which are under construction, and 4 additional at a place called Chapel Cross. There are only two that are operating.

Representative VAN ZANDT. How far will we go in exchange of the technology?

Mr. STRAUSS. The exchange in the technology on Calder Hall is not limited. The exchange with respect to subsequent reactors will have to be negotiated.

Representative VAN ZANDT. Does it mean that we are going to have representation at Calder Hall constantly?

Mr. STRAUSS. On the job, no. We have not asked for that at all. That would not be necessary in order to enable us to secure the information that we desire.

Representative VAN ZANDT. You are convinced that we are going to have almost unlimited access to the technology that is developed at Calder Hall?

Mr. STRAUSS. It is limited to Calder Hall and it is limited to the technology developed up to the end of the year. That is up to January 1.

Senator ANDERSON. May I ask whether that is available to private industry in the United States, or only available to the Government?

Mr. STRAUSS. To the Government and our contractors.

Senator ANDERSON. But not available to private industry?

Mr. STRAUSS. It is not available to industry generally, Senator. That is for the reason——

Senator ANDERSON. Well, your answer is it is available to the United States Government and our contractors, that means people who are doing specific work for you in the field. But if they are the same contractors, say you have got Westinghouse and General Electric and Babcock & Wilcox, they are all your contractors, but they won't have any of the Calder Hall information unless they are doing specific jobs for you. This is not available to private industry, is it?

Mr. STRAUSS. That is my understanding.

Mr. FIELDS. That is correct, although there will be——

Senator ANDERSON. When you say that is correct, let me finish. Is it correct that the information in Calder Hall is not available to private industry in the United States?

Mr. FIELDS. Except that the British are going to take this information and develop from it, the data that could be disseminated to American industry. It will be less than the total information, Senator Anderson, but it will be the category 1–A, I believe is the name of it, or 2–A–1.

Senator ANDERSON. It is a little difficult for the average layman to understand and for a Member of Congress to understand.

Representative HOLIFIELD. As a matter of fact, if the Government wants to build a natural uranium gas-cooled reactor, they have an agreement up to a certain date to get the information up to a certain point from the British and use it in that reactor and their contractors building the reactor can use it.

Mr. FIELDS. It is not limited to our building a reactor, Mr. Chairman. They are going to give it without any return on our part of the exchange of information, and it is to invoke a two-way tool. They are voluntarily giving us this information up to the 1st of January, whether we are building a reactor or not.

Representative HOLIFIELD. On whether your contractors are. But if your contractor wants to build one of these plants for the X utility company, they have to pay a royalty to the British Government, the same as the private businessmen in England have to pay a royalty to the English Government for the use of the information; is that not true?

Mr. FIELDS. I would not say this was true; no, sir.

Representative HOLIFIELD. You would not say it is true?

Mr. STRAUSS. The point has not been raised and it would have to be negotiated.

Senator ANDERSON. When will the point be raised?

Representative HOLIFIELD. Where do you get the information from, if you don't know how you are going to get it?

Mr. FIELDS. What was the question?

Representative HOLIFIELD. Where do you get the information that the British information is available to you, if you don't have it?

Mr. FIELDS. It is being compiled right now. We have this from the Chairman of the British Atomic Energy Authority.

Representative HOLIFIELD. We know their policy in England is that the Government controls the information, and releases it to their manufacturers if it is for private purposes on a royalty basis in order to regain their research and development cost. Our policy is different in that we make it available to our manufacturers free. So if we expect to deal with them, we will have to deal on that basis with them.

Now, if this be true and if they do make information available, if the Government went ahead and built a natural uranium reactor, using such information as the British gave you on a free basis, then could you not by improved technology in this particular type of a reactor, would you not be able to improve the technology and then exchange possibly your improved technology with the British for some of the technology they are holding back, and thereby make it available to our people on a comparatively free basis such as you do other technology?

Senator ANDERSON. Would it not be well to put in the record at this point again the testimony that Dr. Libby gave us, 533 of the authorizing legislation, where he outlines the United Kingdom proposals as follows, 1, 2, 3, and 4, and describes what the British have done and have not done, for the sake of the record if someone might examine it?

Representative HOLIFIELD. Without objection, that will be done.

(The information referred to follows:)

UNITED STATES ATOMIC ENERGY COMMISSION,
Washington, D. C., June 6, 1957.

HON. CARL T. DURHAM,
Chairman, Joint Committee on Atomic Energy.

DEAR MR. DURHAM: In our letter to you of March 8, 1957, the Commission summarized the present civil information cooperation with the United Kingdom and identified in particular several issues which have emerged in recent months. Subsequently, further discussions were held in London with representatives of the United Kingdom Atomic Energy Authority on this subject. In addition, the Commission has just concluded talks in Washington with Sir Edwin Plowden, Chairman of the United Kingdom Atomic Energy Authority.

You may recall that one of the basic problems set forth in our letter of March 8, was that the United Kingdom treats commercially valuable information differently than the United States. In summary, it is Government policy in the United Kingdom to require private industry to pay a royalty for such information made available by the British Government as a contribution toward the cost that the British taxpayers incurred in financing the research and development work involved. This policy was reaffirmed by Sir Edwin Plowden during our Washington discussions as not only now applying in the atomic-energy field but as having been for years a general policy applying to any information developed by the British Government which has a commercial application.

Our discussions were characterized by frankness and there was a recognition by both sides that the basic problem of exchange between the United States and the United Kingdom of commercially valuable information was very complex. As a step toward a solution of the overall problem, Sir Edwin Plowden

made a proposal with respect to information on the Calder Hall reactor which the Commission has accepted.

However, it was mutually agreed that further discussion should take place, possibly in the autumn, to appraise progress made under the British proposal on the Calder Hall reactor and to explore possible additional steps in other areas aimed at achieving a resolution of the difficulties caused by the different policies followed by the two Governments in handling governmental information which has commercial implications.

The United Kingdom proposal is as follows:

(1) The United Kingdom Atomic Energy Authority will make available to the AEC and our direct contractors all detailed information on the Calder Hall design itself, subject to a cutoff date of January 1, 1957, i. e., the original Calder Hall design and all modifications introduced up to the date stated.

(2) The United Kingdom Atomic Energy Authority will make available for circulation to the United States access permit holders a body of information adequate in the view of the Authority for the evaluation of the Calder Hall reactor. This body of information would be subject to the same cutoff and would include some detailed information which is characterized by article II.A.2 of the bilateral agreement.

(3) If the United States access permit holders or any United States firms want more detailed information than available to them under the above proposal, the United Kingdom Atomic Energy Authority will facilitate license arrangements with the British industrial consortia.

(4) The above proposal is not conditional on the receipt by the Authority from the Commission of similar information on Shippingport.

The Commission has accepted this proposal and will shortly hold technical discussions with the appropriate representatives of the Authority to place this proposal in effect.

Sincerely yours,

W. F. LIBBY, *Acting Chairman.*

Senator ANDERSON. When we asked about this $40 million, Dr. Davis, you said, since it said not to exceed 50,000 kilowatts, it was bound to be adequate, or words to that effect. That means that it could be 100 kilowatts, or 200 kilowatts, or 5,000 or 10,000 kilowatts or 20,000 kilowatts. That is not a very satisfactory answer from my standpoint. What will the $40 million buy in terms of electrical kilowatts as you see it?

Dr. DAVIS. Well, I don't think that we would know enough about the cost of the gas-fueled reactors in this size but it would be somewhere between 40,000 and 50,000 kilowatts.

Representative VAN ZANDT. On this particular question, if my memory serves me correctly, did not the AEC include this project in their initial program that went to the Bureau of the Budget and was deleted by the Bureau of the Budget?

Dr. DAVIS. We had a natural uranium heavy water moderated reactor for which we were talking about funds in case industry did not build that type. But that was not intended to be a gas-cooled graphite-moderated reactor.

Representative VAN ZANDT. How much money was that?

Dr. DAVIS. Somewhere of the order of $40 million to $50 million.

Mr. STRAUSS. That and the homogeneous reactor were the two.

Representative COLE. Does item 15 or 16 comply with the type of reactor which the Commission requested funds for and which was denied?

Mr. STRAUSS. They do not for this reason: Item 15, a pilot plant to develop natural uranium heavy water technology, we think, is premature because of our cooperation with Canada in this field we believe

will provide us with this information without the necessity for spending that money.

Project 16, the plutonium recycle pilot reactor is an extremely important project, but we had not intended to include that, and did not include it, in our request for funds for 1958 because we thought that 1959 would be as soon as we would have sufficient progress in hand to begin to develop it.

Representative COLE. Is Hanford the proper place for that plutonium recycle reactor to be located?

Mr. STRAUSS. Is there any reason it should be at Hanford, General Fields?

Mr. FIELDS. We have had some work going on at Hanford and studies on plutonium recycle work. I presume if this went forward that would be the logical place for it to go.

Representative COLE. You do not have any objection to item 16?

Mr. STRAUSS. This, of the various items, is the one that I think we would eventually want to do. We had not planned to do it, however, in 1958. Our technology is not at the point where we would know precisely how to start on it.

Mr. FIELDS. Mr. Cole, if I could answer you further, it would depend upon the amount of work being done at Hanford. If there were a lot of other work and if there were a dual-purpose reactor at Hanford, one might have to examine whether they had the capability to handle both of these.

Representative COLE. If this item 16 is enacted in your authorization law, does that require the Commission to solicit appropriations to carry out the item within the ensuing fiscal year?

Mr. STRAUSS. We have to go to the Bureau of the Budget first.

Mr. FIELDS. We have to go to the Bureau of the Budget and I am not sure I got the significance of your questions.

Representative COLE. Assuming item 16 is enacted as a part of the authorization act, must the Commission exercise its authority and obtain appropriations to carry out that project or at least to start it within the coming fiscal year, or may that authorization be carried over to a following fiscal year?

Mr. STRAUSS. May I ask Mr. Burrows to respond to that?

Mr. BURROWS. If the Commission did not feel it was in a position to build a reactor, there is no requirement to ask for funds.

Representative COLE. Would this authority still be available to the Commission as a subsequent year?

Mr. BURROWS. Yes.

Mr. STRAUSS. Mr. Chairman, may I comment on the fact that projects 15 and 16 are unlike the two preceding projects, in that they are not apparently designed to produce power. They are research projects.

Representative HOLIFIELD. That is correct.

Senator ANDERSON. Could we conclude that the projects in this bill, 7, 14, 15, and 16, are items that the Commission would prefer to have out of the bill?

Mr. STRAUSS. With the understanding, Senator, that the Commission has not as a Commission considered this bill, and only Commissioner Vance and I are available and that is a fact, as representing our point of view.

Senator GORE. Admiral, I understood you to respond to Chairman Holifield's question a few moments ago as to the restrictions which

may or may not be placed on information available from the Calder Hall plants by the British, a recitation of the lack of quid pro quo.

Did you mean to say or imply that there are no restrictions on the use of this information?

Mr. STRAUSS. No, I am sorry, Senator, what I said was——

Senator GORE. I understood what you said but I did not quite understand that there are restrictions and what they are.

Mr. STRAUSS. The restrictions are that this information is available to the Commission and to the contractors of the Commission, but it is not available to the general public.

Senator GORE. As I understand it then, you are not in a position and you do not have the information in such a fashion that you are privileged to make it available to private concerns except that they make a direct contract with the Commission.

Mr. STRAUSS. No, that is not strictly speaking, the way of it either.

Senator PASTORE. It does not go that far.

Mr. STRAUSS. No; it does not go that far. This information for which we have given nothing is available to the Commission and its contractors for the use of the Government, but not for private use. That is to say, my understanding is that the General Electric Co. is entitled to make use of it in a project for the United States.

Senator PASTORE. At Hanford.

Mr. STRAUSS. Or anywhere, but GE is not in a position to make use of this for, say, the Pittsburgh Power Co.

Senator GORE. To state it another way, you are not in a position to make it available to those companies for their own use.

Mr. STRAUSS. That is correct.

Senator GORE. You can only use it for the Government of the United States.

Mr. STRAUSS. At this juncture.

Senator GORE. Which means that you could only utilize the technology from the Calder Hall experience in the construction of a Government-owned reactor?

Mr. STRAUSS. At the present time.

Senator GORE. Thank you.

Senator PASTORE. If we knock out these four authorizations from this bill, we cannot use that information at all.

Mr. STRAUSS. The information from Calder Hall is not only of great service to the Commission from the point of view of building such a reactor, if that were to be done—I don't think it should be done because I believe it is a very inefficient type of reactor—but it will be useful to the Commission in deciding whether my belief is a sound one.

In other words, in arriving at a proper evaluation of the worth of this particular type of reactor.

Senator PASTORE. I am not being critical, but I am stating the fact. It is a fact that if these four authorizations are deleted, whether the information that we have or the license we have from the British Government with reference to the Calder Hall technique, whether it is bad or good, is of no avail.

Mr. STRAUSS. That is not so either, Senator, because the information we will have on Calder Hall is ours in perpetuity.

Senator ANDERSON. What good does it do you?

Senator PASTORE. If you cannot use it now——

Mr. FIELDS. We would not be using it to build a reactor; that is what I think you mean.

Representative VAN ZANDT. Would it assist you in making a decision?

Senator PASTORE. If we deleted these four projects of which we are talking, from this authorization bill, then we have nothing under authority where we can put to practical use the information that comes to us on the Calder Hall reactor.

Mr. FIELDS. I still believe that is incorrect, Senator. It would be limited if you did not have item 14, that would be the way I read it. The others are not uranuium, gas-cooled, graphite reactors.

Senator PASTORE. Well, if we release all four, then to be sure we have nothing in the authorization bill to put to practical use, that particular knowledge. Is that right or wrong?

Mr. STRAUSS. It is wrong because you will not say for the future.

Dr. DAVIS. I think that I would like to stick my nickel's worth in. There are a couple of situations where this information will be helpful. One of these is in the gas-cooled gas turbine work, the Aerojet General is doing under our Army contract.

If the Florida Power group go ahead with their gas-cooled, heavy-water, moderated reactor, this information would be available to them as a Government contractor and would be of use to them in their fuel element problems and then, secondly, there is this point that we do have three groups now studying gas-cooled reactors and making evaluations of them so that we can be sure that our judgment is right as to the promise of this particular type of reactor.

Representative COLE. Who are those groups?

Dr. DAVIS. North American Aviation, American Radiator, and Standard, and Hanford.

Chairman DURHAM. Are you going to be dependent if you strike out item 15 on Canada for the information that Dr. Zinn has to have to build the Florida reactor?

Dr. DAVIS. Well, Mr. Durham——

Chairman DURHAM. Does that not relate to his reactor?

Dr. DAVIS. This does not relate and in any case it would not be finished in time enough to be of any great assistance to him.

Chairman DURHAM. Do you think he is going to build that down there in 60 days?

Dr. DAVIS. I am sorry.

Chairman DURHAM. You do not think he is going to build that in 6 months? You can build an experimental reactor in less time than you can a big-type reactor or one like he is going to build.

Dr. DAVIS. No; but I think here Du Pont very clearly is not in a position yet in any case to say exactly what kind of a reactor they think is going to be built.

Chairman DURHAM. They have approached you on it?

Dr. DAVIS. They have approached us 2 or 3 times and each time they said they wanted to think about it some more and come back.

Chairman DURHAM. Maybe you have not given them any encouragement.

Dr. DAVIS. I thought we had.

Senator PASTORE. I am sorry that we had to leave, but I am rather curious because usually it works just the other way. The departments come in and they want more authorization than the Congress is willing

to give them, and here we have four large projects that the Commission is unwilling to accept.

Now, could you give me a brief explaination of why? You have already gone through that.

Mr. STRAUSS. I will try to. The first part of the explanation, I think you might say is that we think our program is a good one and is adequate.

The second part of the explanation applies to the merits of a specific reactor. I think before you came in, we discussed them one at a time. The dual purpose reactor we thought was undesirable because it did not advance the production of the lowest cost power, or the lowest cost plutonium.

Senator PASTORE. Do you have a program at Hanford now, for a single-purpose plutonium-producing reactor?

Mr. STRAUSS. The reactors at Hanford are single purpose.

Senator PASTORE. But now in line with this, with this thought that we should have more plutonium, do you consider any explanation there?

Mr. STRAUSS. No. We discussed this too, while you were out, and there is a division of opinion in the room here as to whether or not the Commission should build more plutonium producers.

The requirement for plutonium is stated annually by the President of the United States in a direction to the Commission.

Senator PASTORE. But who advises the President on how much he should ask for? Now, I do not think the President sits down and figures this out for himself. Somebody else tells him.

Mr. STRAUSS. The Department of Defense indicates the number of weapons and the relationship between the number of weapons and the material required to produce the weapons is a joint determination by the Department of Defense and the Commission where the Department of Defense is represented by a statutory body, the Military Liaison Committee, which is familiar with the components of weapons.

Senator HICKENLOOPER. Mr. Strauss, I think perhaps at least from my viewpoint, we confuse the function of the Commission sometimes. As I have said time and time again, I think we sometimes confuse the function of this committee.

Now, I take it to be the function of the Commission to meet requirements and to carry on directional activities which the Congress directs, for instance, in the power field. That is, to meet the requirements which the experts of various kinds say are necessary for our national security.

It is not the function, in my judgment, of the Commission to go out and anticipate further needs necessarily.

If a requirement is laid down that we will need more fissionable materials certain years hence, it then becomes the duty of the Commission to make those representations and say we cannot meet those requirements without additional facilities. But I do not take it that it is the original function of the Atomic Energy Commission to set standards and patterns in national defense, nor necessarily to set standards and patterns in their entirety in even power production. That gets to be policy.

Congress lays down policy. Congress has laid down the policy on national defense that we want the maximum security within the limitations of our peacetime economy without destroying it.

I can take you to any manufacturing business and I can find someone working in that department of that business that says the management does not know how to run this business and we ought to have 17 more automobiles around here. The management is just all out of step. So far as I am concerned, while I value the opinion of the scientists very greatly, I do not value the opinion very much of a scientist who undertakes to say we ought to have more of this unless he has complete access and responsibility to all of the information involved.

It is like a diplomatic operation sometimes. An ambassador will just complain to beat the band because the State Department does not agree with him on what ought to be done in a certain country or a certain area at that time. But the State Department theoretically and actually has the whole world complex under its purview and there may be good and sufficient reasons why that particular action, which seems so apparently needed to the fellow out there on the spot, is not a desirable action in the overall best interests or in carrying out the policies of the United States.

Now, I do not know. I assume that the Atomic Energy Commission must rely upon the requirements set down by the military people, the advice of the General Advisory Committee, and the advice of others, and get all of that together and with the military liaison committee establishing those requirements, and then it is the Commission's job to do its best to meet that.

If the laws are not sufficient, to suggest to this committee that we recommend legislation which will enable the meeting of that.

I do not take the statement of a scientist who works in one compartment of this business, on the overall requirements of this whole program. He does not have access to the information.

Mr. STRAUSS. That comports, Senator, with my views, and I think with that of other members of the Commission. I would like to call attention to this fact: The size, that is the lethal yield of weapons, has enormously increased in recent years.

Senator PASTORE. I do not question anything that Mr. Hickenlooper has said, and I agree with everything that he has said, and I know fundamentally there is the responsibility of the Atomic Energy Commission working in collaboration with the Joint Chiefs of Staff and the President to decree the amount that we need of this and that for our military posture.

I do not quarrel with that. That is a truism that no one can dispute. You have to admit that there is a state of confusion in the minds of some of the members of the committee when you go out in the field and you just do not talk with anybody. We talked to the people who are charged with the projects and charged with the responsibility of the research that we have had at Eniwetok, and men who have been in this field and who have to do the research and have to tell us where we are going, insofar as the science of this whole art is concerned.

When they feel that you need more plutonium and you tell us that we are in fine condition, it does put us in a position of being in between. We are just trying to resolve these questions. I am not trying to remove this responsibility from you or the Joint Chiefs of Staff or the President.

Mr. STRAUSS. I would like to have the privilege of putting Commissioner Vance on the stand for a moment.

Representative PRICE. This committee has diligently followed this program for many years. We do make a practice of going into these installations and into the field and talking to the people who do the actual work.

I think that we do accumulate a little knowledge, that at least permits us to make some decisions. It may have been accidental, but we made decisions. We passed resolutions that make the committee look good. Maybe if we passed another one we might look good again.

I, for one, would not like to see this committee ever lose its pioneering spirit. We have had experiences in the past where this committee strongly backed certain projects which were resisted by the Atomic Energy Commission. The hydrogen bomb was the classic example. The additional plutonium and U–235 capacity at Savannah River, Paducah, and Portsmouth was another. If we had listened to the Commission we would not have had either of these two programs completed when needed. I am also positive, for instance, if it were not for this committee, we would not today have the *Nautilus* submarine and the decision of the Navy to go all out for atomic powered submarines.

I, for one, believe this committee should continue its leadership by encouragement, prodding and legislation if necessary to overcome the inertia of the Atomic Energy Commission when we have ample evidence that the best interests of this country require more speedy advancement to be made.

Chairman DURHAM. I may be confused and I do not know about it, but what confuses me is the fact that the military can come up before our Armed Services Committee and ask for everything in God's world.

Yesterday we passed $1.5 billion for them. They can tell us every installation and everything that they want. They can even ask for $250 million nuclear-powered aircraft carrier, which they got this year, but they cannot tell us how much plutonium or how much weapons they need.

That is perfectly ridiculous to me.

Representative HOLIFIELD. I would like to go to page 8.

Mr. STRAUSS. Could Mr. Vance make a brief statement?

(Discussion off the record.)

Mr. VANCE. I think we should try to relate this discussion as to whether we do or do not have enough plutonium capacity to the subject under discussion, which is the authorization bill.

I will attempt to do so. I think the impression has been created here that the Commission has given no thought to the possibility of increased requirements of plutonium. That is not the case. We have given a great deal of thought to it, as a matter of fact.

We recognize that there is a very good word in the English language called foresight and we have tried to exercise some foresight.

Consequently, if we had a mandate tomorrow from the Joint Committee or from whoever it might come from, to increase the plutonium capacity as much as possible, and as economically as possible and as quickly as possible, that is what we would do.

Senator PASTORE. Do you have the authorization for it, Mr. Vance?

Mr. VANCE. No, sir, up to date we have not been able to obtain from anybody an indication of the necessity of doing it.

Senator PASTORE. That is right. I want it clearly understood that I am not saddened by the fact that I am told by Mr. Strauss and told

by you, Mr. Vance, that our plutonium production facilities are adequate.

On the contrary, I am gladdened by the fact.

Mr. STRAUSS. Adequate to the present demands.

Senator PASTORE. But I was somewhat disturbed by the fact that I was told that we needed so much more, and you come here and you find out that maybe you do not, and I just pray to God that you gentlemen are right and that they are wrong.

Representative HOLIFIELD. We are planning reactor programs for power throughout the country, and the people that are planning these reactors in many instances are planning what I call dual-purpose ones.

There is a substantial byproduct of plutonium. The Commission has recognized that and set a $30 flat price for at least the 1 year of 1963 and whether it will be extended, our testimony shows they do not know at this time.

But a lot of the people that are building reactors are thinking about the dual revenue-producing factors, the two factors, the sale of power and the sale of plutonium to the Government.

Now, it seems logical that if this practice is going to be followed by private industry and if the Government is going to be obligated as they are by law to buy the plutonium, that we ought to be thinking something about an efficient combination, and an efficient combination where the price of the power has some affect on the plutonium or the plutonium has some affect on the price of the power, either way you want to put it.

It is because of this thinking, this line of thinking, and because of the line of practice by private people like the PRDC that the committee feels that there should be some advance in the art with a definite idea in mind of producing a dual-purpose reactor or which would have two prongs of value of it, one of which might offset the other, and might eventually work out that you would get a 75 percent power production, and a 25 percent plutonium production or any other percentage that you might want to have it produce.

That might be mutually advantageous within one reactor. This is the thinking of some of the members of the committee.

Mr. VANCE. Mr. Holifield, I would like to say something in that connection. In the last conversation I had with Walker Cisler, I told him that I thought that he was pursuing a very dangerous course in estimating plutonium income over the useful life of his reactor.

Representative HOLIFIELD. I agree with you.

Mr. VANCE. And I think it is thoroughly unsound for anyone building a reactor in this country or abroad to give anything but nominal weight to the value or sales value of plutonium produced because sooner or later that price is going to be $12 a gram or less, and that effect upon the cost of electricity produced is less than 1 mill. I think the person building a reactor, assuming he can get $30 for example, per gram for plutonium produced, is building a house on sand.

Representative HOLIFIELD. I agree with that completely, and I agree with your thinking on that completely, but nevertheless, they are doing that and nevertheless, we are faced with the problem of recycling plutonium so that when the time comes that it is not needed

for weapons, it will have an economic value which again will help to offset the operational cost of the reactors.

It is a matter of degree, and our thinking is very close together, except that it is a matter of degree of importance and timing probably.

Senator GORE. Mr. Chairman, I too, agree with what Commissioner Vance has said. We reviewed that in the subcommittee and reviewed that provision in the contract and in fact, in an aside to ourselves, Chairman Holifield and I expressed such sentiment as you have expressed.

But there was this additional thing that I had in mind as a member of the subcommittee in reviewing this: I thought that there was some merit that must be attached to the research capacity to produce plutonium, and particularly so since some of the reactors at Hanford are now 14 years old. Now, would you comment on that?

Mr. VANCE. Yes, sir, and I would like to comment indirectly but I think I can answer your question, nevertheless, that is, indirectly in this sense.

Senator GORE. You comment as you like. I just wanted to understand.

Mr. VANCE. My objection, if I might put it that way, to the principle of the dual type of reactor is from an engineering standpoint. I think that any machine which you design, whether it is a reactor, or an automobile or what it is—and I know more about automobiles than I did about reactors—when it has to serve two purposes, represents a compromise between those two objectives.

That compromise is always at a sacrifice both ways. In the case of a reactor, I think that sacrifice is on the order of 25 percent less plutonium because of the compromise, and 25 percent higher power because of the compromise.

Now, we have talked today about the effect of the compromise on costs. I do not think that that is the important thing. I think the important thing is the compromise on design and progress in design.

For example, I am quite sure that as we advance our knowledge and our technology of power reactors, we are going to find that the most fertile field for advance is in improvement in fuel elements.

Now, when you have to design a fuel element with two thoughts in mind, not only the production of power, but the production of plutonium, you are handicapping and slowing down the progress that you would make compared with a situation where you are trying to improve this fuel element with just one purpose and that is to produce power at lower costs, which I think is the real objective that we have here.

Consequently, it is the affect on progress and technology, rather than the affect on cost that I think is the important thing.

Representative HOLIFIELD. Your arguments are all sound except you do not apply them.

Mr. VANCE. Except what?

Representative HOLIFIELD. In the issuance of licenses you have issued licenses or construction permits to several of the very type of compromises which you are speaking of and you are prepared to go ahead and issue more.

Mr. VANCE. I am not prepared to respond to that question.

Representative HOLIFIELD. I am speaking of the cooperative reactors which also produce plutonium and which are putting great stress upon the fact that they are going to have a certain amount of income to help them operate them, and so forth.

It does not seem to me that the Commission is consistent when they say, or come to us for money continuously for reactors which are admittedly dual purpose, as I understand dual purpose, that is they produce varying degrees of plutonium as well as power——

Senator GORE. Mr. Chairman, I had not quite finished this question of having reserve capacity. I recognize the validity of what you say, Commissioner, but there are circumstances in which a compromise serves a very useful purpose.

I have in mind a farm family that is unable to own both an automobile and a truck, but they buy a pickup and it serves both purposes admirably.

Now, I am not sure that this is not such a case. I happen to feel a little uneasy about our productive capacity in plutonium. Maybe my uneasiness should be allayed by the statements we have had here today, but I will say I still have an uneasiness about our productive capacity and about the age of the reactors at Hanford.

It seems to me that some merit must be attached to the establishment of a reserve capacity, and perhaps the Government and perhaps this committee would not want to finance outright now, a nuclear reactor for producing plutonium only, without the request from the military and from the President and from the Commission.

But it seems to me that there is some merit which you have not yet dislodged in my mind in having reserve capacity from a dual purpose reactor.

Mr. VANCE. Senator, the analogy that you made is right in my ballpark, and you talked about passenger automobiles and trucks, and the compromise which is the pickup.

Let me say, Senator, in that regard, that if you took the most competent engineering organization in the automotive industry, and told them that your objective was in pickup, this dual-purpose vehicle that you have, you would not be riding around in the comfortable automobile that you drive.

The man who is operating the truck would not be having a good truck, because both designs would be compromises. You see what I mean?

Senator GORE. Yes, but suppose you have circumstances in which you need a compromise. These pickups are very efficient, too.

Mr. VANCE. A very small percentage of the total, sir.

Senator PASTORE. May I ask this question, now, Mr. Vance. You stated as a fundamental engineering truth, this thing and why is there so much divergence of opinion on this point?

The reason I ask you that question is this? Mr. Cisler was in my office one day and I do not know whom he quoted, whether he quoted Mr. Zinn or Dr. Fermi, but he quoted someone who said that the whole future in this field was in the breeder type.

Mr. VANCE. He feels that way.

Senator PASTORE. How can a man like that make that kind of a mistake after what you have said?

Mr. VANCE. I think I can tell you the basis on which he feels that way. It is a very simple basis.

Here is a type of reactor which when developed successfully, will produce more fissionable material than it consumes. That is the whole story from his point of view. He thinks in other words, that when the art is perfected and that particular segment that he is interested in, he thinks he is going to have a more economical production of electrical energy than will come from any other type of reactor.

Senator PASTORE. In your opinion, he is making a serious mistake?

Mr. VANCE. I would not say he is making a serious mistake, and he may be right in the long run, but I do not think he is right for the short term. By short term I mean as far as we can see at the present time.

Senator GORE. You mean he is making a mistake so far as his financial structure in calculating upon a $30 return on plutonium?

Mr. VANCE. Very much so; yes, sir.

Senator PASTORE. I must say this: When I visited Hanford, I thought if any place was a natural for dual-purpose reactors, this is it. There they are away out there and they need power.

Mr. VANCE. Power only costs 2½ mills out there.

Senator PASTORE. If there is any place that could be the place, and you say economically it is not the wise thing to do.

Mr. STRAUSS. If you wanted to maximize the production of plutonium, as a reserve, one of the ways you could do it would be by enabling the Commission to make very long contracts for the purchase of plutonium at prices which would enable private builders of reactors to see the income from the plutonium for the life of the reactor.

Then, I think that you might find quite a difference in the number of reactors.

Senator PASTORE. That is not my problem. Inasmuch as I thought Hanford was a natural for this kind of a reactor, and now that you people have taken the position that economically it is not the proper thing to do, then I resolve in my own mind, that you have reached a policy now, that a dual-purpose reactor is not the kind of reactor we ought to be exeprimenting with.

If we want power, we ought to get away from that.

Representative HOLIFIELD. But the chairman just said that if you will make a long-term contract, we will have dual-purpose reactors, and from private sources.

Mr. STRAUSS. They will be reactors which will sell their plutonium to you, but they will still be maximized for power.

Representative COLE. Are there any more items, Mr. Chairman, that you would like to have us consider? I suggest that you move along.

Representative HOLIFIELD. I would like to get to page 8. This is a short policy question.

We have decided, after listening to all of this and analyzing this, the majority of the subcommittee have indicated that the present arrangements with cooperatives and negotiations which have been carried on for a couple of years are discriminatory as between cooperatives, that they are not a way to get on with the job in an expeditious manner, and we have explored the possibility of direct contracts between the commission and the equipment manufacturers and the retention of complete control over developments and design and construction and modification and operation of these reactors and the sale by the Commission of steam from the reactor on a fixed basis,

based on the projected cost of steam or the present cost of steam from plants using conventional fuel.

In other words, it is the Shippingport formula.

Representative COLE. When did the majority of the subcommittee ever express a viewpoint?

Representative HOLIFIELD. I have conferred with Mr. Durham and Mr. Gore and Mr. Kilday.

Representative COLE. Individually and privately, but what I mean is, there has been no sitting down by the subcommittee and coming to——

Representative HOLIFIELD. There is an agreement on the part of the subcommittee on this.

Representative COLE. I was never invited to participate in any such decision. I was not a part of it and I just want to say that I——

Representative HOLIFIELD. I placed this before the committee.

Representative COLE. Do not say the majority of the subcommittee has approved it, because there has been no meeting for that purpose, and I have been attending these meetings rather faithfully and regularly, and I do not like the idea of legislation being drafted and submitted here on the support of some private conversations.

Representative HOLIFIELD. I am not going to get into a controversy with my friend, and he has done some things I have not approved of in the past.

Senator GORE. May I say just this: I believe that there may be a slight difference in point of view.

Representative HOLIFIELD. As long as we have brought the subject up, I am going to have about 25 amendments to offer to this bill when it gets to the floor, if certain conditions prevail.

Representative COLE. I will give you 15 minutes of my time.

Senator GORE. May I say that we are, in fact, meeting as a subcommittee here. Now, it is true, as Congressman Cole says, we have not acted as a subcommittee, and we are sitting as a subcommittee now. But the chairman did poll me by telephone as to what my attitude was on this, and I suppose it is that kind of thing to which he refers when he says that a majority of the subcommittee has indicated approval on this. But he did not mean any official action by the subcommittee.

Representative COLE. But I, as a member, was never even polled, and my opinion was never even solicited.

Chairman DURHAM. You were here when we discussed this, and decided to postpone it and hear the Commission.

Representative HOLIFIELD. You asked the Commission to come before us, and, otherwise, we would have taken action in the regular manner.

Representative COLE. But it was never represented as being the opinion of the majority of the subcommittee.

Representative PRICE. Probably the reason you were polled, and possibly the reason Mr. Durham was polled, was that there was some doubt whether you would be present and we wanted to know how you felt. I am not a member of the subcommittee.

Representative HOLIFIELD. I make no excuses for presenting after the work that I have done on this, a draft for subcommittee consideration and for full committee consideration.

Representative COLE. I do not criticize you for that at all.

Repesentative HOLIFIELD. And there would have been a vote previously taken if it had not been for your request, and I wanted to show the courtesy to your request, which I always hope I will, and I invited Mr. Fields and Mr. Davis yesterday and the Commission today to get their views upon this.

Senator GORE. I move that we invite them to give their views now. Admiral Strauss has an engagement; let us get his views.

Mr. STRAUSS. I do not know what the question is.

Representative COLE. On page 8, Mr. Strauss.

Mr. STRAUSS. In the first place, Mr. Chairman, I don't believe that the charge you made, that our negotiations with these cooperatives have been discriminatory, will rest if we have an opportunity to explain to you that they came in to us separately, at various times, and proposing various kinds of arrangements, and that these negotiations have continued over a period of many months; nor have any of them represented to us, since these negotiations are not secret, that we have favored one as against another, which would be my interpretation of discrimination.

The Commisison was anxious to see that these cooperatives were helped for two reasons. In the first place, because we believed that cooperative companies have a place in the power picture, just as private companies have, and also because there were five different reactor concepts involved in their proposals.

We have been under the impression, and I think some of these companies had—perhaps all of them, with the exception of those which are not eligible for REA funds—that they would get loans to finance the projects from the REA.

I believe that they have been disabused of that belief. We hate to see them dropped out of the picture, and we would like to find, with your cooperation, some way of helping them become financed, not only for the purpose of having them in the business, but also in order that these quite small plants may be built to demonstrate these five different procedures, and it is our belief, that though they are small, we will be able to derive from them important and, indeed, decisive information as to the place of these types of reactors in the economic picture.

Does that agree with your feeling?

Mr. VANCE. Yes.

Senator GORE. How does that mean you stand with respect to this particular provision?

Representative HOLIFIELD. Could I respond just a moment to what you said about discriminatory? I did not mean, by that, that there was a purpose on the part of the Commission to be discriminatory. I meant the results of the negotiations as they were proposed evolved a series of negotiations which were similar in nature, but which in some instances, and I will try to be specific, in the instance of Chugach, the Government could put in something like $13 million or $16 million or whatever it was, and, at the end of 90 days of noneconomic operation, they could cancel.

That is their proposal. I know that none of these four proposed contracts have been signed up.

On the other hand, Chugach steam for electrical kilowatts was at a cost of about 12½ mills and a possible sharing of a cost up to

13½ mills. Then, if they decided after a 90-day operation it was noneconomic, they could cancel out.

Now, my question is: If this happens, where does the Government get its quid pro quo out of building and operating a reactor in that particular area? We have invested several million dollars, and I think that if you have passed upon this as a type of reactor that should be built, and I will point out it is just about as far in the future as the natural-uranium reactor is as far as the status of technology is concerned, but, if it is decided upon, then I say that the Government should protect itself and insure itself enough operation period to get the knowledge out of it that we want.

Now, we step down to the Piqua, Ohio, negotiations. They are negotiating on a basis of 2.88. Mr. Gallagher told me that they did not intend to go beyond the economic price of purchasing steam, that they would furnish a generator, and most of these projects are alike in the fact that they furnish the turbogenerating equipment, but that they would insist upon buying this at 2.88 mills for the steam because that is what they could build a plant and produce it for, and they were not romancing, but they were in business.

Now we go to, I believe, the Wolverine, and the Wolverine or the Elk River, neither one of them have a firm proposal for the cost of their steam because it is involved in a circuitous group of negotiation provisions which provide certain post-construction research and development and, in some instances, in the two instances where plutonium is purchased by the Government, it involves the purchase of plutonium to cover the operating costs.

That is for a period of time that the money that you have asked for, which we have included in this bill here, would allow them to operate. No one knows whether it will be 5 or 3 years.

In one case, at the end of a year, one of the people wanted to have the privilege of cancellation, and so this is different from the one that has the 3 months.

Now, in the case of, I believe it is the Wolverine, they have not asked for waiver of fuel, and it has not been offered to them. In the case of some of the other plants, in the case of getting out of the cooperative field and getting into the other field, they say that if reprocessing is given to the co-ops, then they are going to ask for it.

I am speaking of the Yankee people and the PRDC, that if free reprocessing of fuel items is offered to the co-ops, they are going to make the best deal they can and they are going to ask for it, too.

With the retroactive provision in the third-round proposal, we believe they may have a right to come in.

Mr. FIELDS. I do not understand the subject of reprocessing.

Representative HOLIFIELD. That is covered by postconstruction research and development contracts.

Mr. FIELDS. Indirectly; yes, sir.

Representative HOLIFIELD. I know all of these are indirect. So I say that the four cooperative programs are not uniform and yet the Government is putting in the money from the reactor and they are putting in the fuel, and they are doing the reprocessing and they are covering the no-subsidy provision by a postconstruction research and development program, and in some instances also with the purchase of plutonium.

I say that the uncertainty of fuel costs is dangerous for the cooperatives, and the lax control which you deal through this third party is not conducive to the best interests of the Government in getting the maximum amount of research and development.

Mr. STRAUSS. What do you mean, "the third party"?

Representative HOLIFIELD. The AEC dealing through a cooperative to a contractor in place of dealing direct.

Mr. STRAUSS. May I ask Dr. Davis to comment on this? I would like to say that the virtue of uniformity in these contracts is somewhat lost on me.

As you know, we have different kinds of contracts with other contractors to the Commission. We make the most advantageous deals for the Government that we can.

These people have come in at different times under different sets of circumstances and uniformity, if that is your objective, and if that is the objective of the committee, will mean the constant alteration of existing contracts to give them the benefit of the most favored clauses that derive from any subsequent contract.

I do not know how that can be done.

Representative HOLIFIELD. The chairman does not believe that uniformity should be extended throughout the Government, but you are dealing with these people on the basis that you would deal maybe on a bid contract of some kind. It is just not that. It is a Government-financed operation from top to bottom, and I do not see why it should not be handled in the regular Government way, the same as you did Shippingport and Duquesne.

Mr. STRAUSS. I am sure that uniformity is the least of the considerations that you have mentioned. You have mentioned a number of others, and I would like to have Dr. Davis, with your permission, discuss these separate contracts.

Representative HOLIFIELD. We have had hours of testimony from Dr. Davis already on this, but if he can add anything to our understanding on this——

Mr. STRAUSS. I thought this was the definitive session and that was the reason for my suggesting it.

Dr. DAVIS. Without trying to extend it too long, I think we recognize many of the problems that you brought up, and these have been the very things that have led to difficulties in trying to finalize the contracts.

However, I think we ought to at least recognize how we got into this situation.

Representative HOLIFIELD. I know all of this. I recognize that you offered a second round and people came in with proposals, and I recognize all of this, but we are faced now with a situation that has developed, and what we are trying to do now is to bring about some type of a businesslike arrangement, and some real close direction of the construction of these reactors if they are to be built on a Government basis.

That is what the Government is doing, without all of this fiction of going about and doing it in a competitive bid or competitive negotiating sort of a way.

Dr. DAVIS. The way we have gotten into this situation was on the basis of the proposals made to us.

Representative HOLIFIELD. I know that, and I am trying to get you out of it.

Dr. DAVIS. In the first place, the various groups asked that there be such a program and they were quite insistent on it. They were told what the ground rules were, and in fact they were explained to them in detail, and they still came in with proposals which in no instance came to anywhere close to the ground rules.

We pointed this out to them, and they said if you will give us some time, we will try to see if we can fit into this. This is a brief history of what we have been doing since April 1, 1956, which is when this started.

Representative HOLIFIELD. I realize that.

Dr. DAVIS. Each one of these things is in a somewhat different circumstance, and certainly there are different kinds of people involved. I think that we would like to find some way to carry out these projects on a rational basis, recognizing all of these difficulties.

However, I do think that one has to keep in mind that these things are intended to be prototypes of commercial plants, and not reactor experiments. They are not experiments in the sense of the SRE or reactors of this sort. So we have been struggling to find some way to do this where we could leave with the cooperatives involved the maximum amount of their own direct participation to try to achieve as near a commercial situation as possible, recognizing that these small plants and in their initial operations, as first plants, were not going to be economic.

So what we have attempted to do, and it has been a very difficult struggle obviously, is to find some formula by which we could retain this participation and retain such value as we could from these people who had made proposals and had made the proposals to undertake the projects and work out a satisfactory arrangement.

Now, we would still like to see this done to the greatest extent possible, but I think we all agree that there certainly are some very serious problems in just exactly how to set these up. If there weren't, we would have gotten these contracts negotiated long ago.

Senator GORE. Mr. Chairman, I appreciate Dr. Davis' restatement of that which he has already told us. The subcommittee likewise has carefully considered and has undertaken to bring forward a program which would do what the Chairman of the Commission has just stated the Commission would like to do, to find some way to go forward with the construction of demonstration reactors or prototype commercial reactors utilizing the public power agencies that have responded to round No. 2.

If the Commission gave its reaction, either support or opposition to what the subcommittee has not formally presented but which is now before you, I was on the telephone.

If you have not, I would love to know just your reaction. Maybe the Commission has not formally acted on this either, but if you have a position on it, I would like to know it and I am sure the other members of the subcommittee would.

Mr. STRAUSS. We have not acted on it, but our informal view which, in the absence of a quorum, is the best that we can give you is that we would rather go ahead with it on this basis than to drop these projects because we feel that these five projects are important to be explored in this manner.

Representative COLE. To clarify that, you would like to go ahead on this basis?

Mr. STRAUSS. On the basis provided in this draft.

Representative COLE. If this draft is not adopted, does that mean that the project will be abandoned?

Mr. STRAUSS. No, it means that we will be continuing to try to help these people find some method of financing. We have not yet ourselves talked to the REA. At least I have not. Whether there is some persuasion still left in us or not, I do not know. But Dr. Davis is not optimistic.

We had not asked for this assistance and, therefore, to that extent in this measure it is gratuitous, but I would hope that it would be adopted. I would like to see it adopted with respect to these plants.

Representative PRICE. You would like to see this section adopted?

Mr. STRAUSS. I would like to specify and identify it, and I will read it and the general manager has something that he would like to say on it.

Mr. FIELDS. You are talking about section 111.

Representative PRICE. Section 111.

Representative HOLIFIELD (reading):

> Arrangements for projects sponsored by cooperatives and publicly owned agencies shall be carried on by direct contract between the Commission and the equipment manufacturer or engineering organization with respect to the development, design, and construction of the nuclear reactor and related facilities and by direct contract between the Commission and the cooperative or publicly owned organization with respect to the provision of site and conventional turbogenerating facilities, operation of the entire plant including training of personnel, the sale by the Commission of steam from the reactor or complex to the cooperative or publicly owned organization—

and there has been a suggestion that the rest of that paragraph is not a good paragraph by your staff.

We have looked at this type of language:

> At a rate based on present cost of or projected cost of steam from a plant using conventional fuel.

This is tentative language which, Mr. Burrows, we tried to arrive at in regard to your criticism of the fact that "established" was a very vague word there.

Mr. FIELDS. Could I make a comment on this section now? You recall that the various proposals and their features did differ. We recognized that there were things in those proposals that would not be satisfactory to us, and we have been negotiating and they would have been more uniform, I would say, in their treatment of this operational period, when we got to the end of these negotiations.

Now, it has become clear to me——

Representative HOLIFIELD. May I say I am not critical because they are uneven, and I recognize the full history of it and I do not see how they could have been otherwise, but now that we find ourselves in this position, I have this opinion.

Mr. FIELDS. Now that we have reached this point, it is my conclusion that if these are to go ahead, and I think that they should having reached this point, for this period of operation it should be on a cost operation in selling the steam. This would be agreeable and this is in effect, what you are saying here, and this is probably the basis upon which it should be.

I do think it would be helpful, though, if there wasn't the inflexibility of the contractual arrangement that we can make here with each one of these.

It says, with every one of them we must have a direct contract with the equipment manufacturer, and in every one of them we must have a contract with the operator.

There might be a case, and I think that we have 1 or 2, where it would be advantageous to have a contract with the utility company to supervise or run the whole thing.

Representative HOLIFIELD. Would you explain that in a specific way, because we have talked to several of the manufacturing people and the manufacturing people have, without exception that we have talked to, indicated that they feel like they would rather deal directly with the Commission.

Mr. FIELDS. They may wish that, and the result may not necessarily be better in that fashion.

Representative HOLIFIELD. That is why I would like for you to explain to me why it would not be better considering the fact——

Mr. FIELDS. I believe we would want to make direct contracts in most of the cases, this is true.

Representative HOLIFIELD. It would seem like it would give you this advantage, it would give you direct and immediate control without going through an intermediary, in the actual construction and immediate decisions on the modifications and if you got to a point where you did need additional money, for instance if you started to build one of these reactors at a $6 million cost and you got to the point like all of these reactors have gotten to where accelerating prices or changing designs which seem necessary from the standpoint of the technology, require $3 million more, if you would then come and lay that before this committee, I am sure the committee would go ahead. If however you have a fixed price with the contractor through a cooperative, you would not then be able, as I understand the general language of the law, to make a major modification from a standpoint of future furthering of the technology without coming back another year.

Mr. FIELDS. I do not know whether it would be another year.

Representative HOLIFIELD. This would give you more flexibility within your 15 percent.

Mr. FIELDS. We would still have to come back for more money, whether it was by a direct contract or by this other route.

Representative HOLIFIELD. If it was within your 15 percent allowable, you would not.

Mr. FIELDS. In either case, if it was within the 15 percent, we would not have to come back, I presume.

But whether it is direct contract or via the cooperative, I do not believe this has a bearing on whether we have to come back. But, Mr. Chairman, there are a number of these proposals where I would certainly hope that we would get advantage of the fixed prices that have been offered here by the equipment manufacturers.

Representative HOLIFIELD. I think you can drive just as hard a bargain with the manufacturers directly.

Mr. FIELDS. And then also, where we can, we should get the cooperative in on the arrangements. They are vitally interested in this working right and they want the system to get going and they want

the power to work properly, and there will be instances where it would pay off to have them get into the management of it.

Representative HOLIFIELD. The language provides you can have direct contracts with them as to the operation and training and so forth. That will give them the scientific knowledge which they will need and the only scientific knowledge they can get out of it will be observing its construction and learning to operate it under your supervision.

Senator GORE. The Commission could also under the terms of the bill or the proposal, as I understand it, utilize the co-ops administrative staff for supervision and for management.

But now you have not touched on one point and that is the responsibility of this committee. You are asking us to authorize expenditures of large numbers of millions of dollars and we feel, that is I feel—and excuse me for using "we," and I do not want to get into that trouble—but I would feel more comfortable in the exercise of my responsibilities if this committee could hold the Commission more directly responsible for these reactors.

Representative HOLIFIELD. I would like to be included in that.

Senator GORE. Unless this committee or unless the Congress authorizes——

Mr. FIELDS. I think the actual request for the authority here is in terms of dollars for these projects.

Senator GORE. I understood we were requested to authorize these projects, in some manner.

Mr. STRAUSS. Not for these specific projects.

Senator GORE. These are the only submissions you have and the second round is closed, and so I had presumed that you meant these particular projects.

Mr. STRAUSS. I think under this construction here, we would be carrying on each one of them and furthermore, there is no provision in this language, as I read it, for authority to the Commission to discontinue these things, after they have been run and after the knowledge has been gained from them and we have learned everything we wished to know.

Senator GORE. I think that I would want that.

Representative HOLIFIELD. We discussed that and I might say that we were in favor of it, and we thought that we might make it in the language up above there in section (C), where we say each prototype reactor demonstration facility authorized by this—we did discuss this informally, that we thought that you should not consider this as a mandate to go into these programs because it may be that you cannot consummate an agreement with the four of them.

But we are taking it as we find it, that if you do consider these projects justified on the basis of increasing the art and technology, and if you do go forward, you go forward in this manner.

Now, I agree with you, sir, that you should not be bound to operate these reactors any longer than the Commission deems it of advantage to the Government in the way of research and development and operational experience and when that time comes, and when these are no longer of any research and developmental value to you, I think at that time that you should not carry them on at a subsidy to the cooperatives and at a high cost to the Government.

Senator GORE. Subject to a reasonable cancellation period.

Mr. STRAUSS. That raises a point of who will own the conventional generating equipment and who will finance that.

Representative HOLIFIELD. They own that now. We would not change the fact that they participate from the standpoint of the generator, anymore than we did the Duquesne and Shippingport one.

It would be very much on a pattern with your Shippingport and Duquesne operations.

Mr. VANCE. I would like to suggest that you consider changing that very point and I would like to point out to you that so far as co-ops are concerned, they do not have capital of their own with which to buy any part of this complete installation.

Therefore, if we are not permitted to arrange for and hold title to the electric-generating equipment, which we would not be as this is now written, then they have to go to REA and that is Government money, too.

Representative HOLIFIELD. This is their obligation to furnish the turbogenerating equipment.

Mr. VANCE. But they have to go to REA for the money.

Representative HOLIFIELD. And two of them already have commitments.

Mr. VANCE. And it is Government money and it comes out of another pocket.

Representative HOLIFIELD. That is true, but we do not want to disturb the REA formula beacuse we get in hot water on the floor if we do. If they can borrow their turbogenerating money for turbogenerators which they are planning to do anyway, and they have already got commitments in two instances, let them go ahead and furnish it.

That would be their contribution to the mutual arrangement. We are not suggesting that you go out and buy the turbogenerating equipment and give it to them, anymore than you did Duquesne.

Mr. VANCE. I think we would be better off if we did.

Representative HOLIFIELD. You are getting into a different problem.

Chairman DURHAM. That is a later question that you can settle later.

Mr. STRAUSS. There are two other points in connection with the section, if I may speak to them. One is section 2, which reads that funds for arrangement with the Power Reactor Development Corp. are authorized for fiscal 1958 only in an amount not to exceed $1,500,000.

It is our feeling that this should be for the full amount of $4,200,000.

Representative HOLIFIELD. I will tell you the thinking of some of us on this: You have a $4 million plus item here for research and development which is going to be done we understand in the Commission facilities.

It is for a plant which has not yet been cleared from the standpoint of safety. This 1 year's expenditure which is what your estimate is, I believe, of the 1958 need would carry you through that year.

By the end of that time you would undoubtedly be to the point where you could get your safety clearance on it if they can get it to you, and I believe we would be in a stronger position if we went on the floor, and I am thinking now of the appropriations committee, if we carried this at this amount.

Mr. STRAUSS. Dr. Davis tells me that the $1½ million figure for the year is wrong and that the estimates are closer to $3 million. It is $4,200,000 for the complete job.

Representative HOLIFIELD. We got those figures from the Commission and we will have to check into that.

Mr. STRAUSS. Could we leave the point and have the staff check on that?

Representative HOLIFIELD. We think that 1 year on this would be a stronger position.

Mr. STRAUSS. If you are convinced of that, does that make any difference?

Representative HOLIFIELD. I think this figure of your need for fiscal 1958 on research and development, you will find, is about this. We did not pull it out of the air.

Dr. DAVIS. I think what happened, Mr. Holifield, is that when we put the figure in originally, in on our budget, it was before the contract had been signed and we anticipated that more work would have been started and done in fiscal 1957.

Actually, we only signed the contract and got a rather small amount of work done in fiscal 1957 so that it has tended to be compressed more into fiscal 1958.

Mr. RAMEY. It is based on your budget figure, that $1,500,000.

Mr. FIELDS. Could we remember that and give you a separate figure on that?

Representative HOLIFIELD. All right, will you review that particular point?

Now, we submitted this language to Mr. Burrows and you can confer with the staff on the language up at the top of the page there, in regard to the established cost, because you understand that the committee's thinking is that we wanted it to be the fair conventional cost, providing they had to put in a plant of their own.

I am talking about a steam boiler and furnishing it and so on, and whatever their costs would be including their capital investment in the boiler, for their steam, would be what we would want represented here. We do not want to give them an advantage, nor do we want to penalize them, but we do want them to pay the conventional cost.

Mr. FIELDS. If you are going to follow this, I think that you should recognize that in an initial period at least, you may have to treat this at one cost, and when you firm up and when it becomes a firm operating plant, you will have to be careful of this.

Representative HOLIFIELD. We are giving them firm steam or intermittent steam and whatever the commercial rate is for the type of steam that you furnish them.

That would be our thought as to what they should pay.

Mr. STRAUSS. Item 3 I do not understand at all, Mr. Chairman. There is an imposition of a September 15 date, and there is a closing date for the third round. I do not know what the reason for that could be or——

Representative HOLIFIELD. You have a $30 million blind item in the authorization. We have to go before the House and before the Appropriations Committee and justify the $30 million blind item.

I recognize that you have been operating this way in the past, but we have a different situation when we face the Appropriations Committee.

You have one offer from the Florida group that I think is around $16 million. I do not know what your northern States—it is about 12 or 13 million dollars estimate.

Dr. DAVIS. It is less than that as far as actual expenditure is concerned.

Representative HOLIFIELD. I am not talking about the waiver of fuel costs. As I understand it, it is $30 million.

Dr. DAVIS. I think Florida is not that high.

Representative HOLIFIELD. Well, whatever it is, our thought was on this that it is going to be very hard for us to justify this $30 million item unless we have something pretty firm to back it up.

Now, it is not going to be hard for us; it is going to be hard for you when you go before the Appropriations Committee.

Mr. STRAUSS. I thought you were going to carry the testimony for us.

Representative HOLIFIELD. We will do what we can on it, and, believe me, we have been doing some work on it, but yesterday I believe it was suggested that this was rather short notice, and I think some suggestion was made to change that to something like 60 days later, which would make the November date January 1, or December 31, 1957, and the other one advanced to the same ratio which would not be later than November 15.

Mr. STRAUSS. That would be all right, Mr. Chairman. I was about to say that the Virginia and Duke companies have told us it is impossible for them to get their figures in by October 1.

Representative HOLIFIELD. You asked if there was any possibility of putting this on a fiscal basis? I do not know the exact point that you are worrying about.

Mr. RAMEY. I think part of this idea was that we have received testimony, a good deal of testimony, that it would take at least 5 years to design and construct a new reactor, and you go back from July 1, 1962.

Chairman DURHAM. This is what is called line items, and this is about the best we can work out for your $30 million items.

Representative COLE. What effect does that have on that part of the authorization, 262, which permits lump-sum general authorization for this research reactor proposals but then requires the Commission to submit specifics at a later time when they know what the details are, which cannot be effective until they lay before the committee for 60 days.

Does that eliminate the necessity of following that procedure? I do not understand what we are after.

Mr. FIELDS. That is what the purpose of that procedure was. My interpretation was that that was a means by which Congress would know how this general project was made into specific projects. It seemed to me that that controlled that authorization. This language does raise the question, Does this add anything except to shorten the time when you have this available authority?

That is all these dates do.

Representative COLE. I do not see the reason for such an early cutoff date on this third round.

Representative HOLIFIELD. It depends, of course, that you are going to have a certain amount of money, $30 million.

Now, how much are you going to need and how much are you going to need on the 2, or 3, or 4 proposals that you have? Are you not going to pretty well use that up?

Mr. FIELDS. As I recall our estimate, we hoped it would cover between 3 and 4 projects.

Representative HOLIFIELD. This takes care of that then.

Mr. FIELDS. We haven't approved these projects.

Mr. STRAUSS. You want as many plants built as possible, and you want as much plutonium produced, and why discourage the situation by having a cutoff date? If we use up the appropriations that is one thing, but wouldn't we like to have the proposals coming in, and why shouldn't the third round be indefinite?

Chairman DURHAM. It is going to hurry these people up.

Mr. STRAUSS. I do not think it hurries them at all, Mr. Durham. This is private industry we are dealing with here, and they are going to be sure of their ground.

Chairman DURHAM. You can say you have to have your project in here.

Representative COLE. The net result of this early cutoff date is that it will result in the Commission being unable to obtain any private sponsorship for these reactors and the Commission thereby will be forced to build the reactor itself in conformity with the chairman, Mr. Strauss' position.

Representative HOLIFIELD. If you are going to continue to postpone the date of completions as you have in the aqueous homogeneous, that——

Mr. STRAUSS. That was solely on scientific grounds.

Representative HOLIFIELD. If you are going to continue to set forward the date of accepting proposals——

Mr. STRAUSS. We did it only with respect to that particular reactor and that was a practical consideration, and there was no subterfuge there.

Representative COLE. Why is it unreasonable to impose a time limit with respect to the third round to the effect that the third round must be finalized by the end of fiscal year 1958 for which this fund of $30 million——

Mr. STRAUSS. It would be in complete consonance, Mr. Cole, with the statement that I made to the joint committee that if, within that time span, these two reactors had not been sponsored by private enterprise, that the administration was committed to request an appropriation for them.

Representative COLE. I do not see why that would be.

Chairman DURHAM. What time would you suggest here?

Mr. STRAUSS. The end of the fiscal year.

Chairman DURHAM. On both of them?

Mr. FIELDS. I do not see any great virtue, Mr. Durham, in two dates. You might as well have one. That is, a final date for approval of negotiations. That is the time we tell you about it, that we have accepted it for negotiations.

Mr. STRAUSS. Frequently, the negotiations go on even during the process of building.

Representative HOLIFIELD. That would mean that if you approved the proposal for negotiations of arrangements in, let us say, June of

1958, we might have another 17 or 24 months before you had a contract?

Mr. STRAUSS. It is conceivable, Mr. Chairman, but it would not be that period of time before work was going on.

Representative HOLIFIELD. Let us consider this matter. We will consider this.

Representative COLE. I would like to go back to the language of this subparagraph 1 of section 111, which is very disturbing to me.

Principally it is because it establishes a highly preferential treatment to cooperatives and municipal utilities. By coincidence, it develops that the sponsors in the second round are publicly owned utilities. But by adopting this language, it means that the Government bears the entire cost and all of the research and the construction of the reactor in connection with that particular project.

Chairman DURHAM. That is what we are doing now.

Representative COLE. If that is adopted by way of law, and that is quite different to put it into the law than it is to obtain the same result by negotiation with the individual sponsors, what position does that leave you in, assuming that subparagraph 1 is adopted, and how does that leave you with respect to negotiating in round 3?

How can you deny to the Florida group, or the Northern States group or any other group, even a public utility group, of asking you to give them the same treatment that you have given the people in the second round?

You are not in a very good position to say, "Well, we cannot give it to you."

Mr. STRAUSS. There is this difference, Mr. Cole, that in the third round, the assets belong to the contractor. In the second round the assets belong to the Government.

In the third round, presumably, they will be more economic reactors which will continue to operate at the pleasure of the corporation providing the funds. In the second round the Government may shut the plant down when it has derived sufficient information from it.

Representative COLE. Are you saying that you do not anticipate that the Florida group will prefer to have the Commission build the reactor and pay for all of the research on the reactor?

Mr. STRAUSS. And shut it down at will.

Representative COLE. Under reasonable limitations, as you contemplate for the second round, rather than for the Florida group to pay for the cost of the reactor and part of the research.

Mr. STRAUSS. I am unable to answer it, but I would presume that any one of these companies would prefer to have the Government pick up a large part of the check. The difference, it seems to me, is this: The second round was limited to reactors of fixed size—five to forty thousand kilowatts. It did not have the attraction to companies needing larger reactors as evidenced by the showing of their disinterest.

Now, if these projects are abandoned by the companies, we have 4 and perhaps 5 different reactor principles that we will have to ask for proposals in connection with, and that will delay the art until we find a number of companies ready to go ahead with them by as much as 1 or 2 years. I am not any happier about it than you are.

Representative COLE. You said that you would like to have it.

Mr. STRAUSS. It is an alternative that is preferable from my point of view to abandonment of this program or the postponement of it.

Representative HOLIFIELD. I would like to advance this one thought, that I do not look upon this second round as setting a precedent for the third round or any other round. I look upon it as an offset for the Shippingport-Duquesne arrangement and it just happens that the amount of money involved is about the amount of money that will be involved in Shippingport.

It may exceed it a little bit. So you have your Shippingport-Duquesne with a private power outfit and you have these little co-ops and the Government in both instances would be doing practically the same thing.

The second round is closed and I hope you will not get into any more of that type, and I do not think that you will after this experience.

But that closes the book as far as I can see, in the way of an offset.

Now, I do not compare the four co-ops with the Florida group, or any other privately owned reactor. I compare it with the only reactor that we have, which is Government-owned, which is the Shippingport reactor and I compare the formula with the Shippingport.

Representative COLE. With the Shippingport experience, if that is to be the precedent for this section with regard to the second round, then why would not Shippingport also be the precedent with respect to the third round?

I do not see how, having once established a precedent for one purpose, you can avoid using that same precedent for other subsequent rounds.

Representative HOLIFIELD. Well, it has nothing to do with the third round.

Mr. FIELDS. Mr. Chairman, in section A–1, if I understand this properly, this is a waiver of the contract, provided we were to have the authority for the appropriations that have been requested for these projects.

We do have the authority without further passage of any law as to contracts for this type of arrangement.

Representative HOLIFIELD. I would think so. The point you are getting at is that these would not have to lay before the committee for 45 days.

Mr. FIELDS. No, sir, we could go ahead and contract directly with the equipment manufacturers and we could contract with the co-operatives, and we could sell the steam in this fashion.

It is not necessary to repeat this, I do not believe, in the authorization act if it is not desired to do so. You would have to authorize the amount of money to be appropriated for the purposes of this second round.

I do not believe it is necessary for this appropriation, and maybe I should ask my General Counsel.

Mr. DIAMOND. I think it——

Representative HOLIFIELD. It may not be necessary to you, but it is going to be necessary to us.

Mr. DIAMOND. We do have authority right now to enter into contracts on the Duquesne basis. This section makes it mandatory that we contract on this basis.

Representative HOLIFIELD. If you contract with these cooperative arrangements?

Mr. DIAMOND. We do have the basic authority and if you in your report stated that you considered we ought to consider this, I think that we would accomplish pretty much the same thing.

Representative HOLIFIELD. We are faced with certain practical problems when we get on the floor of the House. I am trying to get this through in a way that I think we can get it through.

If you agree with the principle of it, and this is specific, and it only applies to the four that you have already been negotiating with, on a different type of negotiating basis, and if you folks do not want to go along with that, it is perfectly all right with me to knock them out and you can knock them out if you want to.

But I think we can get them through on this basis, on the floor, and providing we are not faced on the floor with a situation of attempts to cut everything else out that the committee finally agrees upon.

I will tell you plainly, and I want it on the record, that I am writing a bunch of amendments to offer on the floor in case certain things happen. This will go down the drain and several others. That is not a threat; I am just telling you how I feel about the situation.

Is there any further question from the committee?

Chairman DURHAM. What is the situation? Is the Commission going to pass upon it in writing as to what they object to and what they do not object to? I would like to know that. Before taking any action, I think you should give us a letter as to what you disagree to, and what you do not disagree to and let us know so we will know where we are.

Before I take it on the floor of the House, I think that should be done.

Representative PRICE. I just want to ask one question. I want to get out of here, too.

I have been concerned about striking from the original bill which you sent down here, this item for the Brookhaven National Laboratory. I know one time before the committee you justified the setting back of the appropriation that is in here, but since the justification of this and striking it out of the bill, I have heard considerable to the effect that this was really a serious cut and would retard research there very seriously.

Mr. FIELDS. Is this an item that is cut, or is it a rephrasing of the language?

Representative HOLIFIELD. In this particular one.

Mr. STRAUSS. Where are you reading, Mr. Price?

Representative PRICE. I was reading on page 4, under the items which were struck, but I understand that it is on page 7–A.

Mr. STRAUSS. It is not our understanding that these are struck.

Mr. FIELDS. This was increasing a previous amount.

Representative HOLIFIELD. Is this the one that we were talking about? Has that been take care of?

Mr. BURROWS. The original proposal to the Budget was for improvement, and the Bureau of the Budget cut that back.

Representative HOLIFIELD. What page is that on?

Representative PRICE. Do we understand that it is still a serious cut?

Representative HOLIFIELD. A shortage up there was given to us, by the expenditure of about $3½ million, that it would take a panel twice the number of scientific experiments as there are now.

Mr. FIELDS. I recall now, Mr. Chairman. We dealt with this at some length in a hearing here one day, and I remember Senator Hickenlooper was present at that time. This was an item which originally was put in at a higher figure—I believe it was $3½ million—but, in the course of the review of the budget, and the reductions which we then determined we would make in the program on the overall fiscal limits imposed upon us, we determined that only one part of this project should go forward at this time. We have not in any way turned down the remaining part of this project, and we may be in in fiscal 1959 for the rest of it. There are two separate projects. We have asked for money for this one for this particular year.

Chairman DURHAM. Will that $1 million carry on the work there this year?

Mr. FIELDS. It will result in definite improvements in the way they can operate, insofar as the safety of that is concerned, and the radiation there as I understand it. It will increase the target area utilization.

Chairman DURHAM. You have already spent a lot of money there.

Representative PRICE. The people at Brookhaven describe this as a major blow to research there.

Representative HOLIFIELD. Is this $1,420,000—would that be a patchwork job which would be wasted?

Mr. FIELDS. It would not be wasted.

Representative HOLIFIELD. It would be progressive, could it?

Mr. FIELDS. It would be progressive, and it would not be wasted, as I understand it. Obviously, all of these places could use more facilities.

Mr. RAMEY. It might be more economical to contract for all of these at the same time.

Mr. FIELDS. It could be.

Representative HOLIFIELD. Would you check into that and let us know, if you could, tomorrow? We will be working on this language, and, with the Senate tied up like it is, I do not think it is going to do us as much good to hurry as we thought it would. We are under pressure from the Appropriations Committee to get this to them.

We are going to try to get it to them as quickly as possible, but, in the perfecting of some language in this bill, go ahead and look it over, and we have agreed at least on some of the principles, and consult with Mr. Ramey and Mr. Burrows that language that he was concerned with, and we will try to clean this bill up from a language standpoint.

Mr. FIELDS. We may be a little handicapped in consulting with them tomorrow, because we will be before the Appropriations Committee. We could do it late tomorrow.

Representative HOLIFIELD. You will probably want to study on it some.

Mr. STRAUSS. We will comment by letter, as Mr. Durham suggested, on this measure. I will not review it, because we have just so recently completed discussing it, the section 111, but we will say with respect to section 101 that we are not in favor of the prototype reactor for Hanford or the 3 projects 14, 15, and 16 on page 4.

Representative PRICE. I thought you would not oppose 16 because you could see the necessity of it.

Mr. STRAUSS. I said we would not be prepared to go ahead with it in fiscal 1958.

Chairman DURHAM. We can authorize it this year and you can go ahead next year.

Mr. STRAUSS. We will make that distinction clear in our letter.

Chairman DURHAM. There is no use of bringing out an authorization bill for 60 days if we can foresee something in the future.

Representative HOLIFIELD. You are in a position, of course, where I recognize the Bureau of the Budget has prescribed certain things, and I recognize that you cannot, probably, go beyond what the Bureau of the Budget said.

Mr. STRAUSS. There are matters of conviction with me, as well as arrangement with the Budget, and there is no question about that.

Representative HOLIFIELD. Some other people may have some convictions, too.

Mr. STRAUSS. But, for the letter that we write, they will express ours.

Representative HOLIFIELD. We regret that we have taken so much of your time.

(Whereupon, at 7:10 p. m., the hearing in the above-entitled matter was recessed.)

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